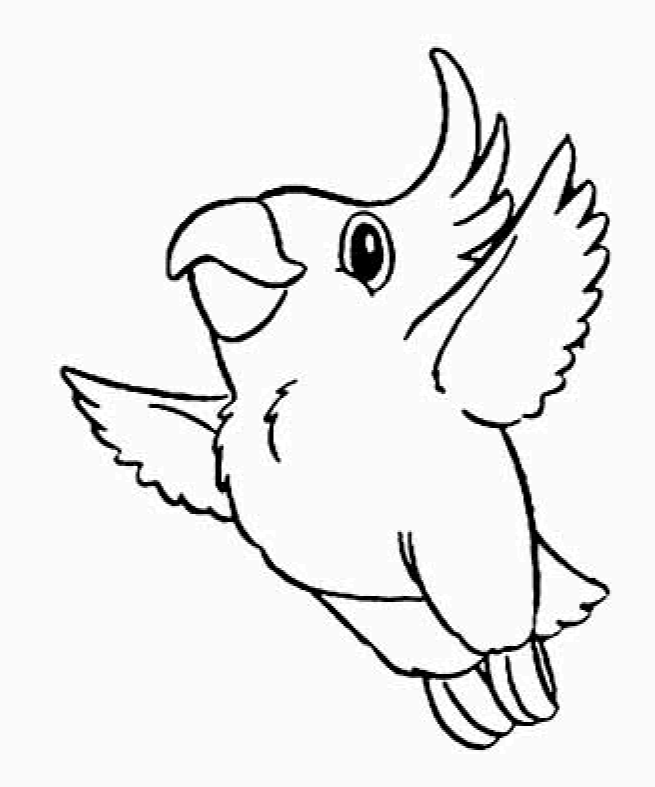
Prep [1]

Algebra - Second Term

Unit [1] - Part [1]



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Prep [1] - Second Term - Algebra - Unit [1] : Numbers and Algebra

Lesson [1] : Repeated Multiplication

Generally

If $\frac{a}{b}$ is a rational number and n is a positive integer , then:

$\left(\frac{a}{b}\right)^n = \frac{a}{b} \times \frac{a}{b} \times \frac{a}{b}$ ... to n times

It is read as « $\frac{a}{b}$ to the power n » or «the n^{th} power of the number $\frac{a}{b}$ »

i.e. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

For example: • $\left(\frac{2}{5}\right)^3 = \frac{2^3}{5^3} = \frac{8}{125}$ • $(0.7)^2 = \left(\frac{7}{10}\right)^2 = \frac{7^2}{10^2} = \frac{49}{100}$

Remark

If $\frac{a}{b}$ is a rational number , then $\left(\frac{a}{b}\right)^0 = 1$ where $a \neq 0$

For example: • $\left(\frac{1}{5}\right)^0 = 1$ • $\left(-\frac{3}{7}\right)^0 = 1$

Remark

If a is a rational number and m is a positive integer , then :

$(-a)^m = (a)^m$ when m is an even number.

For example: $\left(-\frac{1}{2}\right)^4 = \left(\frac{1}{2}\right)^4 = \frac{1}{16}$

$(-a)^m = -(a)^m$ when m is an odd number.

For example: $\left(-\frac{1}{2}\right)^3 = -\left(\frac{1}{2}\right)^3 = -\frac{1}{8}$

Lesson [2] : None Negative Integer Powers

The first law

Generally

If $\frac{a}{b}$ is a rational number , n and m are non-negative integers ,

then $\left(\frac{a}{b}\right)^n \times \left(\frac{a}{b}\right)^m = \left(\frac{a}{b}\right)^{n+m}$

i.e. When multiplying the like bases , we add their powers (indices).

For example:

- $\left(\frac{2}{5}\right)^3 \times \left(\frac{2}{5}\right)^2 = \left(\frac{2}{5}\right)^{3+2} = \left(\frac{2}{5}\right)^5$
- $\left(-\frac{1}{2}\right)^4 \times \left(-\frac{1}{2}\right)^3 = \left(-\frac{1}{2}\right)^{4+3} = \left(-\frac{1}{2}\right)^7$

The second law

According to the first law , you know that : $a^6 = a^2 \times a^4$

, therefore : $a^6 \div a^2 = a^4$, $a^6 \div a^4 = a^2$

Generally

If $\frac{a}{b}$ is a rational number , where $\frac{a}{b} \neq 0$, n and m are non-negative integers , $n \geq m$,

then $\left(\frac{a}{b}\right)^n \div \left(\frac{a}{b}\right)^m = \left(\frac{a}{b}\right)^{n-m}$

i.e. When dividing like bases , we subtract their powers (indices)

For example:

- $\left(\frac{3}{8}\right)^5 \div \left(\frac{3}{8}\right)^2 = \left(\frac{3}{8}\right)^{5-2} = \left(\frac{3}{8}\right)^3$
- $\left(-\frac{2}{7}\right)^4 \div \left(-\frac{2}{7}\right)^2 = \left(-\frac{2}{7}\right)^{4-2} = \left(-\frac{2}{7}\right)^2$

The third law

You know that : $(a^2)^3 = a^2 \times a^2 \times a^2$, and according to the first law : $a^2 \times a^2 \times a^2 = a^6$

i.e. $(a^2)^3 = a^6$

Generally

If $\frac{a}{b}$ is a rational number , n and m are non-negative integers ,

then $\left[\left(\frac{a}{b}\right)^n\right]^m = \left(\frac{a}{b}\right)^{n \times m}$

For example:

- $\left[\left(\frac{3}{5}\right)^3\right]^2 = \left(\frac{3}{5}\right)^{3 \times 2} = \left(\frac{3}{5}\right)^6$
- $\left[\left(-\frac{1}{2}\right)^4\right]^2 = \left(-\frac{1}{2}\right)^{4 \times 2} = \left(-\frac{1}{2}\right)^8$

Exercises

[A] : Choose The Correct Answer : -

1 $\left(\frac{4}{7}\right)^0 =$ ……………

(a) 0 (b) 1 (c) $\frac{4}{7}$ (d) -1

2 $\left(\frac{-2}{3}\right)^2 =$ ……………

(a) $\frac{4}{9}$ (b) $\frac{-4}{9}$ (c) $\frac{4}{6}$ (d) $\frac{-4}{6}$

3 $6 \div 3^0 =$ ……………

(a) 2 (b) 3 (c) 0 (d) 6

4 If $x = y$, then $5^{x-y} =$ ……………

(a) 5 (b) 1 (c) 0 (d) -1

5 If a = b , then $\left(\frac{3}{7}\right)^{b-a}$ equal ……………

(a) zero (b) 1 (c) $\frac{3}{7}$ (d) $\frac{7}{3}$

6 If $x = y$, then $\left(\frac{3}{5}\right)^{x-y} =$ ……………

(a) 0 (b) 1 (c) $\frac{3}{5}$ (d) $\frac{5}{3}$

7 $2^3 \times 2^5 =$ ……………

(a) 2^2 (b) 2^8 (c) 2^{15} (d) 2^{53}

8 $2^3 \times 2^3 =$ ……………

(a) 2^6 (b) 2^8 (c) 2^{15} (d) 2^{53}

9 $3 \times 3^2 =$ ……………

(a) 9 (b) 3^3 (c) 12 (d) 6

10 $3^5 \times 2^5 =$ ……………

(a) 5^{10} (b) 6^{10} (c) 6^5 (d) 6^{25}

11 Half of $2^{10} =$ ……………

(a) 2^9 (b) 2^5 (c) 1^{10} (d) 1^5

12 Half the number $2^{20} =$ ……………

(a) 2^{10} (b) 2^{21} (c) 2^{19} (d) 40

13 The half of the number 2^{16} is ……………

(a) 2^8 (b) 1^8 (c) 2^6 (d) 2^{15}

14	Half of 4^{20} = …………… (a) 4^{19} (b) 2^{20} (c) 4^{39} (d) 2^{39}
15	Quarter of 4^{20} equals …………… (a) 4^{5} (b) 4^{10} (c) 4^{19} (d) 1^{20}
16	Quarter of 4^{2} = …………… (a) 16 (b) 2 (c) 1 (d) 4
17	The additive inverse of the number $(-3)^3$ is …………… (a) 27 (b) – 27 (c) 9 (d) – 9
18	The multiplicative inverse of $(-1)^2$ …………… (a) – 1 (b) – 2 (c) 2 (d) 1
19	$3 + 3 + 3$ = …………… (a) 3^{0} (b) 3^{1} (c) 3^{2} (d) 3^{3}
20	$3^{10} + 3^{10} + 3^{10}$ = …………… (a) 3^{10} (b) 3^{11} (c) 3^{20} (d) 3^{30}
21	$3^{5} + 3^{5} + 3^{5}$ = …………… (a) 9^{5} (b) 9^{15} (c) 3^{15} (d) 3^{6}
22	$3^{x} + 3^{x} + 3^{x}$ = …………… (a) 3^{x} (b) 27^{x} (c) $3x^{3}$ (d) 3^{x+1}
23	$\left(\frac{-5}{6}\right)^2 \div 3\frac{3}{4}$ = …………… (a) $\frac{-5}{27}$ (b) $\frac{5}{27}$ (c) $\left(\frac{5}{27}\right)^2$ (d) $\frac{27}{5}$
24	0.354×100 = …………… (a) 3.54 (b) 35.4 (c) 354 (d) 3540
25	$\frac{0.03}{0.01}$ = …………… (a) 1 (b) [illegible] (c) 0.03 (d) 0.3
26	$\lvert -3 \rvert + \lvert 5 \rvert$ = …………… (a) – 8 (b) – 2 (c) 2 (d) 8
27	$\frac{9}{20}$ = ……………% (a) 9 (b) 18 (c) 27 (d) 45
28	The prime number is …………… (a) 0 (b) 1 (c) 2 (d) – 2

29 Which of the following is the greatest ?

(a) 33% (b) 0.5 (c) $\frac{1}{5}$ (d) 0.25

30 What is the best estimated of the fraction $\frac{1}{6}$?

(a) 15% (b) 17% (c) 20% (d) 25%

31 The value of 7 in the number 4375 is ....

(a) 0.7 (b) 7 (c) 70 (d) 700

32 If a = 3 , b = – 2 , then the value of : 3 a b = ...

(a) zero (b) 18 (c) – 18 (d) 4

33 $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, ... (In the same pattern)

(a) $\frac{1}{5}$ (b) $\frac{8}{9}$ (c) $\frac{15}{16}$ (d) $\frac{20}{25}$

34 $\frac{4a^2b^4}{2a^3b^3}$ = ...

(a) 2 a b (b) $2a^5b^7$ (c) $\frac{2b}{a}$ (d) $\frac{2}{ab}$

[B] : Complete the Following : -

1 3^{zero} = ...

2 $\left(\frac{-2}{3}\right)^0$ = ...

3 $5x^0$ = ...

4 $(x-2)^{zero} = 1$ if $x \neq$ ....

5 The additive inverse of $\left(\frac{\sqrt{2}}{3}\right)^0$ = ...

6 The additive inverse of $(-1)^3$ = ...

7 The additive inverse of $\left(\frac{-2}{3}\right)^0$ is ....

8 The multiplicative inverse of $\left(\frac{-2}{3}\right)^2$ is ....

9 If a = b , then $\left(\frac{3}{11}\right)^{a-b}$ = ...

10	$\lvert 6 \rvert + \lvert -6 \rvert =$ ....
11	The multiplicative inverse of 7 = ...
12	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{5y} =$ .... = ...
13	If $\frac{x}{y} = \frac{7}{2}$, then $\frac{2x}{7y} =$ ....
14	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{3y} =$ ....
15	459.799 ≃ .... to the nearest tenth
16	If $\frac{P}{2} = 4$, $\frac{Q}{3} = 1$, then P : Q = ... : ....
17	1 , 1 , 2 , 3 , 5 , 8 , ... , ... (In its same pattern)
18	(1 , 2 , 3 , 5 , 8 , 13 , ... , ... (in the same pattern)
19	3 , 5 , 7 , 9 , ... (in the same pattern)
20	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).
21	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, ... , ... (In the same pattern)
22	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).
23	The term whose order is 50^{th} in the pattern $\left(\frac{1}{2} , \frac{2}{3} , \frac{3}{4} , \frac{4}{5} , \cdots\right)$ is ....
24	If a = b , then $7^{b-a} =$ ....
25	If $x = y$, then $5^{x-y} =$ ....
26	$2^2 \times 2 = 2^{\cdots\cdots} =$ ....
27	Quarter of 4^{20} equals $4^{\cdots\cdots\cdots}$

28	If $\left(\frac{5}{6}\right)^n = \frac{25}{36}$, then n = ...
29	$\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3 =$ ....
30	If $2^x = 3$, then $4^x =$ ....
31	$\frac{a^2}{b^2} \times \left(\frac{b}{c}\right)^2 =$ .... in the simplest form where $b \neq 0$ and $c \neq 0$

[C] : Essay Problems : -

1	Find the result of : $\frac{7^2 \times 7}{7 \times 7^3}$ 2016 Exam (10) Question (4) (b)
2	Simplify $\frac{x^2 \times x^3}{x^5}$ where $x \neq 0$ 2016 Exam (14) Question (4) (b) (1)
3	Simplify : $\frac{7^3 \times 7^3}{(-7)^2}$ 2018 Exam (13) Question (5) (b)
4	Simplify : $\frac{5^3 \times (-5)^7}{(-5)^8}$ 2016 Exam (1) Question (3) (a)
5	Calculate : $\frac{(-3)^5 \times (-3)^4}{(-3)^7 \times (-3)}$ 2018 Exam (3) Question (4) (a)
6	Put the following expression in the simplest form : $\frac{(-x)^4 \times x^7}{(x^2)^3}$ where $x \neq 0$ 2016 Exam (9) Question (5) (b)
7	Simplify to the simplest form : $\left(\frac{1}{2}\right)^2 \times \left(\frac{-1}{2}\right)^3$ 2018 Exam (1) Question (3) (a)
8	Calculate : $\frac{(5)^2 + (5)^4}{(5)^3}$ 2018 Exam (3) Question (4) (a)

Homework

[A] : Choose The Correct Answer : -

1 $3 \times 3^2 = \ldots\ldots$
(a) 9 (b) 3^3 (c) 12 (d) 6

2 The multiplicative inverse of $(-1)^2$ ……………
(a) -1 (b) -2 (c) 2 (d) 1

3 $\frac{9}{20} = \ldots\ldots\ \%$
(a) 9 (b) 18 (c) 27 (d) 45

4 $2^3 \times 2^3 = \ldots\ldots$
(a) 2^6 (b) 2^8 (c) 2[illegible] (d) 2^{53}

5 The additive inverse of the number $(-3)^3$ is ……………
(a) 27 (b) -27 (c) 9 (d) -9

6 $|-3| + |5| = \ldots\ldots$
(a) -8 (b) -2 (c) 2 (d) 8

7 $2^3 \times 2^5 = \ldots\ldots$
(a) 2^2 (b) 2^8 (c) 2^{15} (d) 2^{53}

8 Quarter of $4^2 = \ldots\ldots$
(a) 16 (b) 2 (c) 1 (d) 4

9 $\frac{0.03}{0.01} = \ldots\ldots$
(a) 1 (b) 3 (c) 0.03 (d) 0.3

10 $\frac{4a^2b^4}{2a^3b^3} = \ldots\ldots$
(a) $2ab$ (b) 2 a[illegible] b^7 (c) $\frac{2b}{a}$ (d) $\frac{2}{ab}$

11 $\left(\frac{4}{7}\right)^0 = \ldots\ldots$
(a) 0 (b) 1 (c) $\frac{4}{7}$ (d) -1

12 If $x = y$, then $\left(\frac{[illegible]}{5}\right)^{x-y} = \ldots\ldots$
(a) 0 (b) 1 (c) $\frac{3}{5}$ (d) $\frac{5}{3}$

13 Quarter of 4^{20} equals ……………
(a) 4^5 (b) 4^{10} (c) 4^{19} (d) 1^{20}

14	$0.354 \times 100 =$ …………… (a) 3.54 (b) 35.4 (c) 354 (d) 3540
15	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, …………… (In the same pattern) (a) $\frac{1}{5}$ (b) $\frac{8}{9}$ (c) $\frac{15}{16}$ (d) $\frac{20}{25}$
16	If a = b , then $\left(\frac{3}{7}\right)^{b-a}$ equal …………… (a) zero (b) 1 (c) $\frac{3}{7}$ (d) $\frac{7}{3}$
17	Half of $4^{20} =$ …………… (a) 4^{19} (b) 2^{20} (c) 4^{39} (d) 2^{39}
18	$\left(\frac{-5}{6}\right)^2 \div 3\frac{3}{4} =$ …………… (a) $\frac{-5}{27}$ (b) $\frac{5}{27}$ (c) $\left(\frac{5}{27}\right)^2$ (d) $\frac{27}{5}$
19	If a = 3 , b = – 2 , then the value of : 3 a b = …………… (a) zero (b) 18 (c) – 18 (d) 4
20	If $x = y$, then $5^{x-y} =$ …………… (a) 5 (b) 1 (c) 0 (d) – 1
21	The half of the number 2^{16} is …………… (a) 2^8 (b) 1^8 (c) 2^6 (d) 2^{15}
22	$3^x + 3^x + 3^x =$ …………… (a) 3^x (b) 27^x (c) $3x^3$ (d) 3^{x+1}
23	The value of 7 in the number 4375 is …………… (a) 0.7 (b) [illegible] (c) 70 (d) 700
24	$6 \div 3^0 =$ …………… (a) 2 (b) 3 (c) 0 (d) 6
25	Half the number $2^{20} =$ …………… (a) 2^{10} (b) 2^{21} (c) 2^{19} (d) 40
26	$3^5 + 3^5 + 3^5 =$ …………… (a) 9^5 (b) 9^{15} (c) 3^{15} (d) 3^6
27	What is the best estimated of the fraction $\frac{1}{6}$? (a) 15% (b) 17% (c) 20% (d) 25%
28	$\left(\frac{-2}{3}\right)^2 =$ …………… (a) $\frac{4}{9}$ (b) $\frac{-4}{9}$ (c) $\frac{4}{6}$ (d) $\frac{-4}{6}$

29	Half of 2^{10} = ... (a) 2^9 (b) 2^5 (c) 1^{10} (d) 1^5
30	$3^{10} + 3^{10} + 3^{10}$ = ... (a) 3^{10} (b) 3^{11} (c) 3^{20} (d) 3^{30}
31	Which of the following is the greatest ? (a) 33% (b) 0.5 (c) $\frac{1}{5}$ (d) 0.25
32	$3^5 \times 2^5$ = ... (a) 5^{10} (b) 6^{10} (c) 6^5 (d) 6^{25}
33	$3 + 3 + 3$ = ... (a) 3^0 (b) 3^1 (c) 3^2 (d) 3^3
34	The prime number is .... (a) 0 (b) 1 (c) 2 (d) -2

[B] : Complete the Following : -

1	If a = b , then $\left(\frac{3}{11}\right)^{a-b}$ = ...
2	(1 , 2 , 3 , 5 , 8 , 13 , ... , ... (in the same pattern)
3	Quarter of 4^{20} equals $4^{\cdots\cdots}$
4	The multiplicative inverse of $\left(\frac{-2}{3}\right)^2$ is ....
5	1 , 1 , 2 , 3 , 5 , 8 , ... , ... (in its same pattern)
6	$2^2 \times 2 = 2^{\cdots\cdots}$ = ...
7	The additive inverse of $\left(\frac{-2}{3}\right)^0$ is ....
8	If $\frac{P}{2} = 4$, $\frac{Q}{3} = 1$, then P : Q = ... : ....
9	If $x = y$, then 5^{x-y} = ...
10	The additive inverse of $(-1)^3$ = ...
11	459.799 ≃ .... to the nearest tenth

12	If a = b , then 7^{b-a} = ……………
13	The additive inverse of $\left(\frac{\sqrt{2}}{3}\right)^0$ = ……………
14	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{3y}$ = ……………
15	The term whose order is 50^{th} in the pattern $\left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots\right)$ is ……………
16	$(x-2)^{zero} = 1$ if $x \neq$ ……………
17	If $\frac{x}{y} = \frac{7}{2}$, then $\frac{2x}{7y}$ = ……………
18	$\frac{1}{9}, \frac{1}{8}, \frac{1}{7}$, …………… , …………… (In the same pattern).
19	$\frac{a^2}{b^2} \times \left(\frac{b}{c}\right)^2$ = …………… in the simplest form where b ≠ 0 and c ≠ 0
20	3^{zero} = ……………
21	$5x^0$ = ……………
22	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{5y}$ = …………… = ……………
23	$\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}$, …………… , …………… (In the same pattern)
24	If $2^x = 3$, then [illegible]^x = ……………
25	$\left(\frac{-2}{3}\right)^0$ = ……………
26	The multiplicative inverse of 7 = ……………
27	$\frac{1}{9}, \frac{1}{8}, \frac{1}{7}$, …………… , …………… (In the same pattern).
28	$\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3$ = ……………

29	$\lvert 6 \rvert + \lvert -6 \rvert =$ ....
30	3 , 5 , 7 , 9 , ... (in the same pattern)
31	If $\left(\frac{5}{6}\right)^n = \frac{25}{36}$, then n = ...

[C] : Essay Problems : -

1	Calculate : $\frac{(5)^2 + (5)^4}{(5)^3}$ 201[illegible] Exam (3) Question (4) (a)
2	Simplify to the simplest form : $\left(\frac{1}{2}\right)^2 \times \left(\frac{-1}{2}\right)^3$ 2018 Exam (1) Question (3) (a)
3	Put the following expression in the simplest form : $\frac{(-x)^4 \times x^7}{(x^2)^3}$ where $x \neq 0$ 2016 Exam (9) Question (5) (b)
4	Calculate : $\frac{(-3)^5 \times (-3)^4}{(-3)^7 \times (-3)}$ 2018 Exam (3) Question (4) (a)
5	Simplify : $\frac{5^3 \times (-5)^7}{(-5)^8}$ 2016 Exam (1) Question (3) (a)
6	Find the result of : $\frac{7^2 \times 7}{7 \times 7^3}$ 2016 Exam (10) Question (4) (b)
7	Simplify : $\frac{7^{[illegible]} \times 7^3}{(-7)^2}$ 2018 Exam (13) Question (5) (b)
8	Simplify $\frac{x^2 \times x^3}{x^5}$ where $x \neq 0$ 2016 Exam (14) Question (4) (b) (1)

Prep [1]

Algebra - Second Term

Unit [1] - Part [2]



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Lesson [3] : Negative Integer Powers

Definition :

If a is a rational number , $a \neq 0$ and n is a positive integer ,

then $a^{-n} = \frac{1}{a^n}$ and $a^n = \frac{1}{a^{-n}}$

For example:

- $3^{-3} = \frac{1}{3^3} = \frac{1}{27}$
- $3 \times 5^{-1} = 3 \times \frac{1}{5} = \frac{3}{5}$
- $\frac{2}{5^{-2}} = 2 \times 5^2 = 2 \times 25 = 50$
- $0.1 = \frac{1}{10} = 10^{-1}$, $0.01 = \frac{1}{100} = \frac{1}{10^2} = 10^{-2}$, ... and so on.

Remarks

1 If a is a rational number , $a \neq 0$ and n is a positive integer ,

then $a^n \times a^{-n} = a^n \times \frac{1}{a^n} = 1$ (the multiplicative neutral)

i.e. each of a^n and a^{-n} is the multiplicative inverse of the other

2 If $\frac{a}{b}$ is a rational number not equal to zero and n is a positive integer ,

then $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$

For example: $\left(\frac{2}{3}\right)^{-2} = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$

Remark

All laws of powers that we have studied in the previous lesson are correct in the case of the negative powers. So , the previous example can be solved by using laws of powers as follows :

1 $2^4 \times 2^{-2} = 2^{4+(-2)} = 2^2 = 4$

2 $\frac{5^{-2}}{5^{-3}} = 5^{-2-(-3)} = 5^{-2+3} = 5$

3 $(3^2)^{-2} = 3^{2 \times (-2)} = 3^{-4} = \frac{1}{3^4} = \frac{1}{81}$

4 $\frac{6^{-3} \times 6^5}{6^2} = 6^{-3+5-2} = 6^0 = 1$

5 $\left(\frac{5^3 \times 5^{-2}}{5^{-1} \times 5^4}\right)^{-2} = (5^{3+(-2)-(-1)-4})^{-2} = (5^{3-2+1-4})^{-2}$

$= (5^{-2})^{-2} = 5^{(-2) \times (-2)} = 5^4 = 625$

6 $(7^3)^2 \times (7^{-2})^2 = (7^3 \times 7^{-2})^2$

$= (7^{3+(-2)})^2 = 7^2 = 49$

Exercises

[A] : Choose The Correct Answer : -

1	$(4)^{-1} =$ .... (a) $-\frac{1}{4}$ (b) $\frac{1}{4}$ (c) 4 (d) -4
2	$3 \times 3^2 =$ .... (a) 9 (b) 3^3 (c) 12 (d) 6
3	$\frac{4\,a^2\,b^4}{2\,a^3\,b^3} =$ .... (a) 2 a b (b) $2\,a^5\,b^7$ (c) $\frac{2\,b}{a}$ (d) $\frac{2}{a\,b}$
4	If a = 3 , b = – 2 , then the value of : 3 a b = ... (a) zero (b) 18 (c) – 18 (d) 4
5	$\left(\frac{-2}{3}\right)^2 =$ .... (a) $\frac{4}{9}$ (b) $\frac{-4}{9}$ (c) $\frac{4}{6}$ (d) $\frac{-4}{6}$
6	If $x = \frac{1}{2}$ and $y = \frac{-1}{4}$, then $(x - y)^{-1} =$ .... (a) $\frac{1}{2}$ (b) 2 (c) 4 (d) $\frac{4}{3}$
7	$\frac{0.03}{0.01} =$ .... (a) 1 (b) 3 (c) 0.03 (d) 0.3
8	$\left(\frac{-5}{6}\right)^2 \div 3\frac{3}{4} =$ .... (a) $\frac{-5}{27}$ (b) $\frac{5}{27}$ (c) $\left(\frac{5}{27}\right)^2$ (d) $\frac{27}{5}$
9	What is the best estimated of the fraction $\frac{1}{6}$? (a) 15% (b) 17% (c) 20% (d) 25%
10	$2^7 \times 2^{-3} =$ .... (a) 2^{10} (b) 2^4 (c) 2^{-4} (d) 8
11	Quarter of $4^2 =$ .... (a) 16 (b) 2 (c) 1 (d) 4
12	Half of $4^{20} =$ .... (a) 4^{19} (b) 2^{20} (c) 4^{39} (d) 2^{39}
13	$3^5 + 3^5 + 3^5 =$ .... (a) 9^5 (b) 9^{15} (c) 3^{15} (d) 3^6

14	If $a^{x} = 4$ and $a^{-y} = 2$, then $a^{x+y} =$ .... (a) $\frac{1}{2}$ (b) 8 (c) 4 (d) 2
15	$(3^{-2})^{-2} =$ .... (a) 3^4 (b) 3^{-4} (c) 3^2 (d) 3^{-2}
16	$2^3 \times 2^5 =$ .... (a) 2^2 (b) 2^8 (c) 2^{15} (d) 2^{53}
17	If a = b , then $\left(\frac{3}{7}\right)^{b-a}$ equal .... (a) zero (b) 1 (c) $\frac{3}{7}$ (d) $\frac{7}{3}$
18	Half the number $2^{20} =$ .... (a) 2^{10} (b) 2^{21} (c) 2^{19} (d) 40
19	The prime number is .... (a) 0 (b) 1 (c) 2 (d) – 2
20	$\left(\frac{-2}{3}\right)^{-3}$ equals .... (a) $\frac{-27}{8}$ (b) $\frac{-8}{27}$ (c) $\frac{8}{27}$ (d) $\frac{27}{8}$
21	$\lvert -3 \rvert + \lvert 5 \rvert =$ .... (a) – 8 (b) – 2 (c) 2 (d) 8
22	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, ... (In the same pattern) (a) $\frac{1}{5}$ (b) $\frac{8}{9}$ (c) $\frac{15}{16}$ (d) $\frac{20}{25}$
23	$6 \div 3^0 =$ .... (a) 2 (b) 3 (c) 0 (d) 6
24	3 + 3 + 3 = ... (a) 3^0 (b) 3^1 (c) 3^2 (d) 3^3
25	$\left(\frac{2}{3}\right)^{-2} =$ .... (a) $\frac{4}{9}$ (b) $\frac{9}{4}$ (c) $\frac{-2}{3}$ (d) $\frac{-3}{2}$
26	The additive inverse of the number $(-3)^3$ is .... (a) 27 (b) – 27 (c) 9 (d) – 9
27	0.354 × 100 = ... (a) 3.54 (b) 35.4 (c) 354 (d) 3540
28	The value of 7 in the number 4375 is .... (a) 0.7 (b) 7 (c) 70 (d) 700

[B] : Complete the Following : -

1	$\left(\frac{-2}{3}\right)^{-3} =$ ....
2	(1 , 2 , 3 , 5 , 8 , 13 , ... , ... (in the same pattern)
3	$459.799 \simeq$ .... to the nearest tenth
4	$3^{zero} =$ ....
5	$\|6\|+\|-6\|=$ ....
6	If a = b , then $\left(\frac{3}{11}\right)^{a-b} =$ ....
7	The additive inverse of $(-1)^3 =$ ....
8	$\frac{a^2}{b^2} \times \left(\frac{b}{c}\right)^2 =$ .... in the simplest form where $b \neq 0$ and $c \neq 0$
9	$\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3 =$ ....
10	If $x = \frac{1}{2}$, $y = \frac{1}{4}$, then $(x + y)^{-1}$ ....
11	If $x = y$, then $5^{x-y} =$ ....
12	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).
13	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).
14	The additive inverse for $\left(\frac{2}{-3}\right)^{-3}$ is ....
15	If $\frac{P}{2} = 4$, $\frac{Q}{3} = 1$, then P : Q = ... : ....
16	If $\frac{x}{y} = \frac{7}{2}$, then $\frac{2x}{7y} =$ ....
17	The multiplicative inverse of 7 = ...

18	The additive inverse of 2^{-1} is ....
19	The additive inverse of $\left(\frac{-2}{3}\right)^0$ is ....
20	$(x-2)^{zero} = 1$ if $x \neq$ ....
21	$\left(\frac{-2}{3}\right)^0 =$ ....
22	$(b^{-1})^{-3} = b^{\cdots\cdots}$
23	$2^2 \times 2 = 2^{\cdots\cdots} =$ ....
24	The term whose order is 50th in the pattern $\left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots\right)$ is ....
25	If $2^x = 3$, then $4^x =$ ....
26	$\left(\frac{5}{7}\right)^{-3} = \left(\frac{\cdots\cdots}{\cdots\cdots}\right)^3$
27	1 , 1 , 2 , 3 , 5 , 8 , ... , ... (in its same pattern)
28	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{3y} =$ ....
29	$\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}$, ... , ... (In the same pattern)
30	$(3a^2)^{-1} = \frac{1}{\cdots\cdots}$
31	$\left(\frac{1}{5}\right)^{-1} =$ ....
32	The multiplicative inverse of $\left(\frac{-2}{3}\right)^2$ is ....
33	The additive inverse of $\left(\frac{\sqrt{2}}{3}\right)^0 =$ ....

[C] : Essay Problems : -

1	Simplify $(10^2)^3 \times 10^{-6}$ 2016 Exam (14) Question (4) (b) (1)
2	Simplify : $\frac{7^{-3} \times 7^6}{7^3}$ 2016 Exam (4) Question (4) (a)
3	Find the value of the following in simplest form : $\frac{7^{-2} \times 7^5}{7^6 \times 7^{-3}}$ 2016 Exam (7) Question (3) (a)
4	Find in the simplest form the value of : $\frac{5^7 \times 5^{-4}}{5^3}$ 2016 Exam (13) Question (3) (a)
5	Simplify : $\frac{(a^{-2})^{-3} \times a^4}{a^{-1} \times a^{11}}$ $(a \neq 0)$ 2016 Exam (3) Question (5) (a)
6	Find the value of : $\frac{(5)^{-4} \times (5)^9}{(5)^3}$ in the simplest form. 2016 Exam (6) Question (3) (a)
7	Evaluate : $\left(\frac{9^3 \times 9}{9^5}\right)^{-3}$ 2016 Exam (15) Question (4) (b)
8	Find the value of $\frac{5^{-4} \times 5^7}{5^3}$ in the simplest form. Model 2018 Exam (2) Question (3) (b)
9	Find the value of : $\left(\frac{7^4 \times 7^{-2}}{7^3}\right)^{-2}$ 2016 Exam (12) Question (4) (a)
10	Simplify (with steps) : $\frac{4^5 \times 4^{-7}}{4^{-3} \times 4^2}$ 2016 Exam (5) Question (3) (mm)
11	Simplify : $\left(\frac{2^5 \times 3^2}{3^4 \times 2^3}\right)^{-1}$ 2018 Exam (11) Question (5) (b)

Homework

[A] : Choose The Correct Answer : -

1	$(4)^{-1} = ...$ (a) $-\frac{1}{4}$ (b) $\frac{1}{4}$ (c) 4 (d) -4
2	$3 + 3 + 3 = ...$ (a) 3^0 (b) 3^1 (c) 3^2 (d) 3^3
3	$3^x + 3^x + 3^x = ...$ (a) 3^x (b) 27^x (c) $3x^3$ (d) 3^{x+1}
4	If $x = y$, then $5^{x-y} = ...$ (a) 5 (b) 1 (c) 0 (d) -1
5	$6 \div 3^0 = ...$ (a) 2 (b) 3 (c) 0 (d) 6
6	Quarter of 4^{20} equals .... (a) 4^5 (b) 4^{10} (c) 4^{19} (d) 1^{20}
7	$\left(\frac{4}{7}\right)^0 = ...$ (a) 0 (b) 1 (c) $\frac{4}{7}$ (d) -1
8	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, ... (In the same pattern) (a) $\frac{1}{5}$ (b) $\frac{8}{9}$ (c) $\frac{15}{16}$ (d) $\frac{20}{25}$
9	$2^3 \times 2^3 = ...$ (a) 2^6 (b) 2^8 (c) 2^{15} (d) 2^{53}
10	The multiplicative inverse of $(-1)^2$ .... (a) -1 (b) -2 (c) 2 (d) 1
11	$\left(\frac{-2}{3}\right)^{-3}$ equals .... (a) $\frac{-27}{8}$ (b) $\frac{-8}{27}$ (c) $\frac{8}{27}$ (d) $\frac{27}{8}$
12	$\left(-\frac{1}{3}\right)^{-1} = ...$ (a) $-\frac{1}{3}$ (b) 3 (c) -3 (d) $\frac{1}{3}$
13	$3^{10} + 3^{10} + 3^{10} = ...$ (a) 3^{10} (b) 3^{11} (c) 3^{20} (d) 3^{30}

14	$(3^{-2})^{-2} =$ .... (a) 3^4 (b) 3^{-4} (c) 3^2 (d) 3^{-2}
15	$3^5 \times 2^5 =$ .... (a) 5^{10} (b) 6^{10} (c) 6^5 (d) 6^{25}
16	The half of the number 2^{16} is .... (a) 2^8 (b) 1^8 (c) 2^6 (d) 2^{15}
17	If $a^x = 4$ and $a^{-y} = 2$, then $a^{x+y} =$ .... (a) $\frac{1}{2}$ (b) 8 (c) 4 (d) 2
18	The value of 7 in the number 4375 is .... (a) 0.7 (b) 7 (c) 70 (d) 700
19	If $x = y$, then $\left(\frac{3}{5}\right)^{x-y} =$ .... (a) 0 (b) 1 (c) $\frac{3}{5}$ (d) $\frac{5}{3}$
20	$2^7 \times 2^{-3} =$ .... (a) 2^{10} (b) 2^4 (c) 2^{-4} (d) 8
21	$0.354 \times 100 =$ .... (a) 3.54 (b) 35.4 (c) 354 (d) 3540
22	$\frac{9}{20} =$ .... % (a) 9 (b) 18 (c) 27 (d) 45
23	If $x = \frac{1}{2}$ and $y = \frac{-1}{4}$, then $(x - y)^{-1} =$ .... (a) $\frac{1}{2}$ (b) 2 (c) 4 (d) $\frac{4}{3}$
24	The additive inverse of the number $(-3)^3$ is .... (a) 27 (b) -27 (c) 9 (d) -9
25	$(7)^{-2} =$ .... (a) 49 (b) $\frac{1}{49}$ (c) 14 (d) -14
26	$\left(\frac{2}{3}\right)^{-2} =$ .... (a) $\frac{4}{9}$ (b) $\frac{9}{4}$ (c) $\frac{-2}{3}$ (d) $\frac{-3}{2}$
27	Which of the following is the greatest ? (a) 33% (b) 0.5 (c) $\frac{1}{5}$ (d) 0.25
28	Half of $2^{10} =$ .... (a) 2^9 (b) 2^5 (c) 1^{10} (d) 1^5

[B] : Complete the Following : -

1	$\left(\frac{-2}{3}\right)^{-3} = \ldots\ldots\ldots\ldots$
2	The additive inverse for $\left(\frac{2}{-3}\right)^{-3}$ is ……………
3	$2^2 \times 2 = 2^{\ldots\ldots} = \ldots\ldots\ldots\ldots$
4	The multiplicative inverse of $\left(\frac{-2}{3}\right)^2$ is ……………
5	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, …………… , …………… (In the same pattern).
6	$(b^{-1})^{-3} = b^{\ldots\ldots}$
7	$\left(\frac{1}{5}\right)^{-1} = \ldots\ldots\ldots\ldots$
8	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, …………… , …………… (In the same pattern).
9	$\left(\frac{-2}{3}\right)^0 = \ldots\ldots\ldots\ldots$
10	$(3a^2)^{-1} = \frac{1}{\ldots\ldots\ldots\ldots}$
11	3 , 5 , 7 , 9 , …………… (in the same pattern)
12	If $x = y$, then $5^{x-y} = \ldots\ldots\ldots\ldots$
13	$(x-2)^{zero} = 1$ if $x \neq \ldots\ldots\ldots\ldots$
14	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, …………… , …………… (In the same pattern)
15	$5x^0 = \ldots\ldots\ldots\ldots$
16	The additive inverse of $\left(\frac{\sqrt{2}}{3}\right)^0 = \ldots\ldots\ldots\ldots$
17	If $x = \frac{1}{2}$, $y = \frac{1}{4}$, then $(x+y)^{-1}$ ……………
18	The additive inverse of $\left(\frac{-2}{3}\right)^0$ is ……………

19	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{3y}$ = ...
20	If a = b , then 7^{b-a} = ...
21	$\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3$ = ...
22	The additive inverse of 2^{-1} is ....
23	1 , 1 , 2 , 3 , 5 , 8 , ... , ... (in its same pattern)
24	Quarter of 4^{20} equals $4^{\dots\dots\dots}$
25	$\frac{a^2}{b^2} \times \left(\frac{b}{c}\right)^2$ = ... in the simplest form where b ≠ 0 and c ≠ 0
26	The multiplicative inverse of 7 = ...
27	$\left(\frac{5}{7}\right)^{-3} = \left(\frac{\dots\dots}{\dots\dots}\right)^3$
28	If $\left(\frac{5}{6}\right)^n = \frac{25}{36}$, then n = ...
29	The additive inverse of $(-1)^3$ = ...
30	If $\frac{x}{y} = \frac{7}{2}$, then $\frac{2x}{7y}$ = ...
31	If $2^x = 3$, then 4^x = ...
32	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{5y}$ = ... = ...
33	$\left(\frac{-2}{3}\right)^{-3}$ = ...
34	(1 , 2 , 3 , 5 , 8 , 13 , ... , ... (in the same pattern)
35	459.799 ≃ .... to the nearest tenth
36	3^{zero} = ...
37	The term whose order is 50th in the pattern $\left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \dots\right)$ is ....

[C] : Essay Problems : -

1	Simplify : $\frac{(a^{-2})^{-3} \times a^4}{a^{-1} \times a^{11}}$ $(a \neq 0)$	2016 Exam (3) Question (5) (a)
2	Simplify to the simplest form : $\frac{3^5 \times 3^{-2}}{3^3}$	2018 Exam (6) Question (4) (a)
3	Find the result of : $\left(\frac{2^3 \times 2^{-4}}{2^{-2} \times 2^5} \right)^{-1}$	2016 Exam (2) Question (3) (a)
4	Find the value of : $\frac{4 \times 4^{-2}}{4^{-3}}$ in the simplest form	2018 Exam (14) Question (3) (a)
5	Simplify : $\left(\frac{2^5 \times 3^2}{3^4 \times 2^3} \right)^{-1}$	2018 Exam (11) Question (5) (b)
6	Simplify (with steps) : $\frac{4^5 \times 4^{-7}}{4^{-3} \times 4^2}$	2016 Exam (5) Question (3) (mm)
7	Find the value of : $\left(\frac{7^4 \times 7^{-2}}{7^3} \right)^{-2}$	2016 Exam (12) Question (4) (a)
8	Find the value of $\frac{5^{-4} \times 5^7}{5^3}$ in the simplest form.	Model 2018 Exam (2) Question (3) (b)
9	Find the value of : $\frac{(5)^{-4} \times (5)^9}{(5)^3}$ in the simplest form.	2016 Exam (6) Question (3) (a)
10	Find the value of : $\frac{7^4 \times 7^{-2}}{7^3}$	2018 Exam (9) Question (5) (a)

Prep [1]

Algebra - Second Term

Unit [1] - Part [3]



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الاسم ....

Lesson [4] : Scientific Notation Of The Rational Numbers

- **Before explaining how to write the numbers in their scientific notation , we should notice the following :**

1 $10 = 10^1$, $100 = 10 \times 10 = 10^2$, $1000 = 10 \times 10 \times 10 = 10^3$ and so on

Hence we find that :

$2000 = 2 \times 1000 = 2 \times 10^3$, $50\,000 = 5 \times 10\,000 = 5 \times 10^4$

2 $0.1 = \frac{1}{10} = 10^{-1}$, $0.01 = \frac{1}{100} = \frac{1}{10 \times 10} = 10^{-2}$,

$0.001 = \frac{1}{1\,000} = \frac{1}{10 \times 10 \times 10} = 10^{-3}$ and so on

The standard scientific notation of a number :

The number is written in the standard form as : $a \times 10^n$ where $1 \le |a| < 10$ and $n \in \mathbb{Z}$

In the following , there are examples for some numbers written in its standard form :

- 4.6×10^8
- 5.236×10^{-6}
- -9.6×10^{10}
- -1.001×10^{-5}
- -3×10^{12}
- 1×10^{-7}

Remark

- Notice that the number 32.4×10^5 is not in the standard form because $32.4 > 10$ and to write it in the standard form , we move the decimal point one place towards left and multiply by 10

i.e. $32.4 \times 10^5 = 3.24 \times 10^5 \times 10 = 3.24 \times 10^6$ (the standard form)

- Notice that the number 0.032×10^{-4} is not in the standard form because $0.032 < 1$ and to write it in the standard form , we move the decimal point two places towards right and multiply by 10^{-2}.

i.e. $0.032 \times 10^{-4} = 3.2 \times 10^{-4} \times 10^{-2} = 3.2 \times 10^{-6}$ (the standard form)

- Notice that the standard form of the number 1 is 1×10^0 , also the number 2 is 2×10^0 , and so on ...

Example 1 **Write each of the following numbers in the standard form :**

1 45×10^8 | **2** 706.4×10^5

Solution

1 $45 \times 10^8 = 4.5 \times 10^8 \times 10 = 4.5 \times 10^9$

2 $706.4 \times 10^5 = 7.064 \times 10^5 \times 10^2 = 7.064 \times 10^7$

Lesson [5] : Order Of mathematical operations

First : Order of performing the mathematical operations in an expression has no parentheses

1. Evaluate the powers. ➡ 2. Perform multiplications and divisions in order from left to right. ➡ 3. Perform additions and subtractions in order from left to right.

Second : Order of performing the mathematical operations in an expression has parentheses

1. Perform the operations within parentheses (interior parentheses then exterior ones). ➡ 2. Evaluate the powers. ➡ 3. Perform multiplications and divisions in order from left to right. ➡ 4. Perform additions and subtractions in order from left to right.

Example 1 Calculate the value of each of the following :

1. $3 + 6 \times (5 + 4) \div 3 - 7$
2. $9 - 5 \div (8 - 3) \times 2 + 6$

Solution

1. $3 + 6 \times (5 + 4) \div 3 - 7 = 3 + 6 \times 9 \div 3 - 7$ (parentheses)

$= 3 + 54 \div 3 - 7$ (multiplication)

$= 3 + 18 - 7$ (division)

$= 21 - 7$ (addition)

$= 14$ (subtraction)

2. $9 - 5 \div (8 - 3) \times 2 + 6 = 9 - 5 \div 5 \times 2 + 6$ (parentheses)

$= 9 - 1 \times 2 + 6$ (division)

$= 9 - 2 + 6$ (multiplication)

$= 7 + 6$ (subtraction)

$= 13$ (addition)

Remark

In the problems containing fractions , we should perform the operations in the numerator and denominator before division.

Exercises

[A] : Choose The Correct Answer : -

1	The number which in the standard form between the following numbers is .... (a) 11×10^8 (b) 9.7×10^{-5} (c) 10.3×10^{-3} (d) 0.87×10^8
2	Half of 2^{10} = ... (a) 2^9 (b) 2^5 (c) 1^{10} (d) 1^5
3	If the number 1.7×10^{10} is written in full form , how many zeroes follow the 7 ? (a) 9 (b) 10 (c) 11 (d) 12
4	$2^3 \times 2^3$ = ... (a) 2^6 (b) 2^8 (c) 2^{15} (d) 2^{53}
5	The value of 7 in the number 4375 is .... (a) 0.7 (b) 7 (c) 70 (d) 700
6	Which of the following is the greatest ? (a) 33% (b) 0.5 (c) $\frac{1}{5}$ (d) 0.25
7	The standard form of quarter million is .... (a) 0.25×10^6 (b) 0.25×10^4 (c) 2.5×10^5 (d) 25×10^4
8	The number 750000 is written in its scientific notation as 7.5×10^n , then n = ... (a) 4 (b) 5 (c) – 4 (d) – 5
9	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, ... (In the same pattern) (a) $\frac{1}{5}$ (b) $\frac{8}{9}$ (c) $\frac{15}{16}$ (d) $\frac{20}{25}$
10	$50000 = 5 \times 10^n$, n = ... (a) 6 (b) 5 (c) 4 (d) 3
11	$3^x + 3^x + 3^x$ = ... (a) 3^x (b) 27^x (c) $3x^3$ (d) 3^{x+1}
12	$\left(-\frac{1}{3}\right)^{-1}$ = ... (a) $-\frac{1}{3}$ (b) 3 (c) – 3 (d) $\frac{1}{3}$
13	If $a^x = 4$ and $a^{-y} = 2$, then a^{x+y} = ... (a) $\frac{1}{2}$ (b) 8 (c) 4 (d) 2

14	$\left(\frac{2}{3}\right)^{-2}$ = ... (a) $\frac{4}{9}$ (b) $\frac{9}{4}$ (c) $\frac{-2}{3}$ (d) $\frac{-3}{2}$
15	$16 \div 2 \times 3 - 9$ = ... (a) 2 (b) $\frac{16}{3}$ (c) 10 (d) 15
16	$\left(\frac{4}{7}\right)^{0}$ = ... (a) 0 (b) 1 (c) $\frac{4}{7}$ (d) -1
17	The half of the number 2^{16} is .... (a) 2^8 (b) 1^8 (c) 2^6 (d) 2^{15}
18	$(7)^{-2}$ = ... (a) 49 (b) $\frac{1}{49}$ (c) 14 (d) -14
19	$9 + 4 \times 3^2$ = ... (a) 45 (b) 117 (c) 24 (d) 33
20	$500000 = 5 \times 10^{......}$ (a) 3 (b) 4 (c) 2 (d) 5
21	Quarter of 4^{20} equals .... (a) 4^5 (b) 4^{10} (c) 4^{19} (d) 1^{20}
22	$3^5 \times 2^5$ = ... (a) 5^{10} (b) 6^{10} (c) 6^5 (d) 6^{25}
23	The additive inverse of the number $(-3)^3$ is .... (a) 27 (b) -27 (c) 9 (d) -9
24	$6 \times 2 - 4 \div 2$ = ... (a) 1 (b) 2 (c) 10 (d) 12
25	7.35×10^{-4} = ... (a) 0.000735 (b) 0.00735 (c) 0.0735 (d) 7350
26	$6 \div 3^0$ = ... (a) 2 (b) 3 (c) 0 (d) 6
27	$(3^{-2})^{-2}$ = ... (a) 3^4 (b) 3^{-4} (c) 3^2 (d) 3^{-2}

[B] : Complete the Following : -

1	$0.00037 = 3.7 \times 10^{n}$, then n = ……………
2	The number 420×10^{4} in the standard form is ……………
3	The value of : $5 [(2^2 - 1) - (2^2 - 3)] =$ ……………
4	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, …………… , …………… (In the same pattern).
5	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, …………… , …………… (In the same pattern)
6	1 , 1 , 2 , 3 , 5 , 8 , …………… , …………… (in its same pattern)
7	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{5y} =$ …………… = ……………
8	$2.37 \times 10^{-4} =$ ……………
9	The value of : $5 \times 6 - 4 \div 2 =$ ……………
10	The multiplicative inverse of $\left(\frac{-2}{3}\right)^2$ is ……………
11	$(x - 2)^{zero} = 1$ if $x \neq$ ……………
12	The additive inverse of 2^{-1} is ……………
13	If $2^{x} = 3$, then $4^{x} =$ ……………
14	0.75×10^{8} in the standard form is …………… × ……………
15	$4 \times 7 - 3^2 =$ ……………
16	$2^2 \times 2 = 2^{\cdots} =$ ……………
17	If $x = y$, then $5^{x - y} =$ ……………

18	$\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3 =$ ....
19	If $\frac{x}{y} = \frac{7}{2}$, then $\frac{2x}{7y} =$ ....
20	The standard form of the number $0.7 \times 0.0005 =$ ....
21	$4 \times 2^3 - 20 =$ ....
22	The additive inverse for $\left(\frac{2}{-3}\right)^{-3}$ is ....
23	3 , 5 , 7 , 9 , ... (in the same pattern)
24	If a = b , then $7^{b-a} =$ ....
25	The additive inverse of $(-1)^3 =$ ....
26	If A = 0.000625 , then $\sqrt{A} = 2.5 \times 10^{\cdots}$
27	The standard form of the number $0.7 \times 0.005 =$ ....
28	$4^2 \div 2 \times 3 - 9 =$ ....
29	$\left(\frac{-2}{3}\right)^{-3} =$ ....
30	$(3a^2)^{-1} = \frac{1}{\cdots\cdots}$
31	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{3y} =$ ....
32	If $\left(\frac{5}{6}\right)^n = \frac{25}{36}$, then n = ...
33	The term whose order is 50^{th} in the pattern $\left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \cdots\right)$ is ....
34	The standard form of 0.000057 = ...
35	$3 \times 4 - 21 \div 7 =$ ....

[C] : Essay Problems : -

1	**Write the standard form of :** 0.00075 2016 Exam (1) Question (5) (a)
2	**Find the result of the following in the standard form :** $(4.4 \times 10^5) \div (2 \times 10^3)$ 2018 Exam (5) Question (3) (b)
3	**Find the value of :** $\frac{3^2 \times 6 \div 3}{2 \times 1 + (3 + 1)^2}$ 2017 Exam (10) Question (3) (b)
4	If $x = \frac{-1}{2}$ and $y = \frac{3}{4}$ **, find in the simplest form the value of :** (1) $x^3 y$ (2) $(x - y)^{-1}$ 2016 Exam (5) Question (4) (a)
5	If $x = \frac{1}{2}$, $y = \frac{4}{5}$ and $z = \frac{5}{2}$, then find : $x^2 y z$ 2016 Exam (2) Question (5) (a)
6	**Simplify (with steps) :** $4^2 \div 2 \times 3 - 9$ 2016 Exam (5) Question (3) (mm)
7	**Find :** [a] $\frac{4}{9} \times 11 + \frac{4}{9} \times 15 + \frac{4}{9}$ 2018 Exam (13) Question (5) (a)
8	If $x = -\frac{1}{2}$, $y = -\frac{3}{4}$ **, find in the simplest form :** $\left(\frac{y}{x^2}\right)^{-2}$ Model 2018 Exam (2) Question (5) (b)
9	If $x = 2$, $y = \frac{1}{2}$ and $z = -2$ **find the value of :** $(x y)^5 + z^2$ 2016 Exam (14) Question (5) (a)
10	**Simplify :** $2^3 + [4 + (2^2 \div 4)]$ 2017 Exam (14) Question (5) (a)
11	**Find :** $30 \div 6 \times 8 - (3 - 1)$ 2018 Exam (2) Question (4) (b)
12	**Evaluate :** $16\,t \div (4\,s) + 3\,s\,t$ for $t = 9$ and $s = 6$ 2017 Exam (15) Question (4) (b)
13	If $x = 2$, $y = \frac{1}{2}$ and $z = \frac{2}{3}$ **Find the result of :** $(x y)^3 + 9 z^2$ 2016 Exam (10) Question (5) (b)
14	**Find the numerical value of the expression :** $3ab + 8a \div (4b)$ when $a = 4$, $b = -2$ Model 2018 Exam (1) Question (3) (b)

No.	Question
15	**Find the result in the simplest form :** $2 \times 6 - 4 \div 2$ 2018 Exam (15) Question (3) (a)
16	**Find the value of :** $12 \times (2)^2 \div 24 + 3^2$ 2018 Exam (12) Question (4) (b)
17	**Evaluate :** $\frac{16\,x}{4\,y} + 4\,x\,y$ for $x = 9$ and $y = 6$ 2017 Exam (12) Question (4) (a)
18	If $x = \frac{3}{4}$, $y = \frac{1}{3}$ **, then find the value of :** $(x^2\,y^2)^{-3}$ 2018 Exam (5) Question (5) (a)
19	**Calculate :** $2\,[\,(5^2 + 1) - (4^2 - 1)\,]$ 2017 Exam (14) Question (3) (b)
20	**Find the value of expression :** $12 \times (2)^2 \div 24 + (-3)^2$ 2017 Exam (9) Question (4) (b)
21	If $t = 9$ and $s = 6$ **find the value of :** $16\,t - 4\,s + 3$ 2017 Exam (4) Question (4) (b)
22	If $x = \frac{3}{4}$, $y = \frac{-3}{2}$ **, then find the numerical value of :** $\left(\frac{x}{y}\right)^2$ 2018 Exam (4) Question (3) (a)
23	**Simplify :** $\frac{1}{2}\,(4\,n - 2) + \frac{1}{3}\,(3 + 9\,n)$, then find its value when $n = 1$ 2017 Exam (8) Question (4) (a)
24	**Simplify :** $2 - [(7 - 3) - 2]$ 2016 Exam (15) Question (5) (a)
25	**Without using calculator find the value of :** $[(11) - (-10)] + 2 \times (-6)$ 2017 Exam (3) Question (3) (a)
26	If $x = 9$ and $y = 6$ **, then find the numerical value of :** $16\,x \div (4\,y) + 3\,x\,y$ 2017 Exam (3) Question (3) (b)
27	If $x = \frac{3}{4}$ and $y = -\frac{3}{2}$, then find the numericla value of : $(x^2 \div y^3)^2$ 2016 Exam (11) Question (5) (a)
28	**Simplify :** $\frac{n}{2}\,(3\,n - 6) + \frac{1}{3}\,(3 + 9\,n)$, then find its value when $n = 1$ 2016 Exam (8) Question (5) (a)
29	**Use the rules of order of operations to find the result of :** $2 + 5^3 \div 5$ 2016 Exam (10) Question (3) (a)
30	**Find the value of :** $10 \times 4 - (2 \times 6 - 8)$ in its simplest form 2018 Exam (14) Question (4) (b)

Homework

[A] : Choose The Correct Answer : -

No.	Question
1	The number which in the standard form between the following numbers is …………… (a) 11×10^{8} (b) 9.7×10^{-5} (c) 10.3×10^{-3} (d) 0.87×10^{8}
2	$6 \times 2 - 4 \div 2 =$ …………… (a) 1 (b) 2 (c) 10 (d) 12
3	$\frac{9}{20} =$ …………… % (a) 9 (b) 18 (c) 27 (d) 45
4	$\left(\frac{-2}{3}\right)^{-3}$ equals …………… (a) $\frac{-27}{8}$ (b) $\frac{-8}{27}$ (c) $\frac{8}{27}$ (d) $\frac{27}{8}$
5	$500000 = 5 \times 10^{\cdots\cdots}$ (a) 3 (b) 4 (c) 2 (d) 5
6	$3^{10} + 3^{10} + 3^{10} =$ …………… (a) 3^{10} (b) 3^{11} (c) 3^{20} (d) 3^{30}
7	$3 + 3 + 3 =$ …………… (a) 3^{0} (b) 3^{1} (c) 3^{2} (d) 3^{3}
8	$9 + 4 \times 3^{2} =$ …………… (a) 45 (b) 117 (c) 24 (d) 33
9	If $x = y$, then $5^{x - y} =$ …………… (a) 5 (b) 1 (c) 0 (d) -1
10	If $x = y$, then $\left(\frac{3}{5}\right)^{x - y} =$ …………… (a) 0 (b) 1 (c) $\frac{3}{5}$ (d) $\frac{5}{3}$
11	$16 \div 2 \times 3 - 9 =$ …………… (a) 2 (b) $\frac{16}{3}$ (c) 10 (d) 15
12	Which of the following is the greatest ? (a) 2.3×10^{4} (b) 2.3×10^{5} (c) 3.2×10^{4} (d) 3.2×10^{5}

13	The multiplicative inverse of $(-1)^2$ .... (a) -1 (b) -2 (c) 2 (d) 1
14	$50000 = 5 \times 10^n$, n = ... (a) 6 (b) 5 (c) 4 (d) 3
15	$5 \times 4 - 8 \div 2 =$ .... (a) 16 (b) 6 (c) 14 (d) 18
16	$(4)^{-1} =$ .... (a) $-\frac{1}{4}$ (b) $\frac{1}{4}$ (c) 4 (d) -4
17	The number 750000 is written in its scientific notation as 7.5×10^n , then n = ... (a) 4 (b) 5 (c) -4 (d) -5
18	If $x = \frac{1}{2}$ and $y = \frac{-1}{4}$, then $(x - y)^{-1} =$ .... (a) $\frac{1}{2}$ (b) 2 (c) 4 (d) $\frac{4}{3}$
19	$2 \times 6 - 4 \times 2 =$ .... (a) 4 (b) 8 (c) 10 (d) 2
20	The standard form of quarter million is .... (a) 0.25×10^6 (b) 0.25×10^4 (c) 2.5×10^5 (d) 25×10^4
21	$0.354 \times 100 =$ .... (a) 3.54 (b) 35.4 (c) 354 (d) 3540
22	If the number 1.7×10^{10} is written in full form , how many zeroes follow the 7 ? (a) 9 (b) 10 (c) 11 (d) 12
23	$6 \div 3^0 =$ .... (a) 2 (b) 3 (c) 0 (d) 6
24	Which of the following is the smallest number ? (a) 314×10^3 (b) 3.14×10^4 (c) 31.4×10^5 (d) 0.314×10^8
25	$2 \times 6 - 4 \div 2 =$ .... (a) 10 (b) 4 (c) 2 (d) 1
26	$7.35 \times 10^{-4} =$ .... (a) 0.000735 (b) 0.00735 (c) 0.0735 (d) 7350
27	$3 \times 6 - 4 \div 2 =$ .... (a) 3 (b) 7 (c) 16 (d) 20

[B] : Complete the Following : -

1	$0.00037 = 3.7 \times 10^n$, then n = ...
2	$4 \times 2^3 - 20 =$ ....
3	$3 \times 4 - 4 \div 2 =$ ....
4	$\left(\frac{1}{5}\right)^{-1} =$ ....
5	$\left(\frac{-2}{3}\right)^{-3} =$ ....
6	The standard form of the number $0.7 \times 0.0005 =$ ....
7	0.00037 in scientific notation = ...
8	$25 \div (4 + 1) =$ ....
9	Quarter of 4^{20} equals $4^{\cdots\cdots}$
10	$4 \times 7 - 3^2 =$ ....
11	$196 \div (7 - 5)^2 =$ ....
12	$2 \times 6 - 4 \div 2 =$ ....
13	$5x^0 =$ ....
14	0.75×10^8 in the standard form is .... × ....
15	$3 \times 4 - 21 \div 7 =$ ....
16	✱ If $0.0006 = 6 \times 10^n$, then n = ...
17	$(b^{-1})^{-3} = b^{\cdots\cdots}$
18	The value of : $5 \times 6 - 4 \div 2 =$ ....

19	The standard form of 0.000057 = ...
20	459.799 ≃ .... to the nearest tenth
21	$7\,(6^2 - 5 \times 6) =$ ....
22	$2.37 \times 10^{-4} =$ ....
23	The term whose order is 50^{th} in the pattern $\left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \cdots\right)$ is ....
24	The multiplicative inverse of 7 = ...
25	If $5000 = 5 \times 10^n$, then n = ...
26	The value of : $5\left[(2^2 - 1) - (2^2 - 3)\right] =$ ....
27	$4^2 \div 2 \times 3 - 9 =$ ....
28	If $x = \frac{1}{2}$, $y = \frac{1}{4}$, then $(x + y)^{-1}$ ....
29	(1 , 2 , 3 , 5 , 8 , 13 , ... , ... (in the same pattern)
30	The number 420×10^4 in the standard form is ....
31	The standard form of the number $0.7 \times 0.005 =$ ....
32	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).
33	$\frac{a^2}{b^2} \times \left(\frac{b}{c}\right)^2 =$ .... in the simplest form where $b \neq 0$ and $c \neq 0$
34	If A = 0.000625 , then $\sqrt{A} = 2.5 \times 10^{\cdots\cdots}$
35	$28 \div 4 + 3 - 2 \times 5 =$ ....
36	The additive inverse of $\left(\frac{\sqrt{2}}{3}\right)^0 =$ ....

[C] : Essay Problems : -

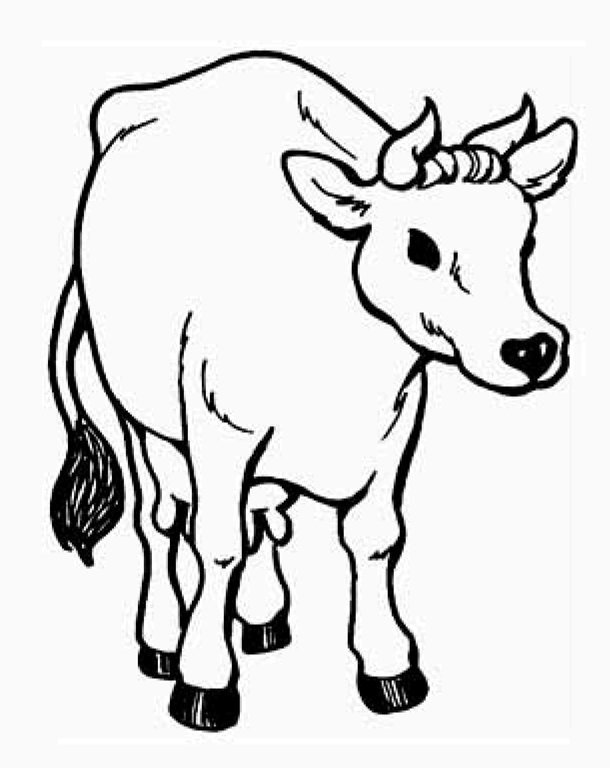
1	**Find the value of :** $12 \times (2)^2 \div 24 + 3^2$ 2018 Exam (12) Question (4) (b)
2	**Simplify :** $2 - [(7-3) - 2]$ 2016 Exam (15) Question (5) (a)
3	**Simplify :** $n(n-2) + 2(n+1)$, then find the numerical value of the result when $(n = -1)$ 2016 Exam (7) Question (5) (a)
4	If $x = \frac{1}{2}$, $y = \frac{-3}{2}$, $z = \frac{3}{4}$ **Find the value of :** $\left(\frac{x+y}{z}\right)^{-2}$ 2018 Exam (3) Question (4) (b)
5	**Simplify :** $\frac{1}{2}(4n - 2) + \frac{1}{3}(3 + 9n)$, then find its value when $n = 1$ 2017 Exam (8) Question (4) (a)
6	If $x = \frac{-3}{2}$, $y = \frac{-4}{3}$, find in the simplest form $\left(\frac{x}{y}\right)^2$ 2016 Exam (9) Question (3) (a)
7	If $a = \frac{-1}{3}$ and $b = \frac{2}{3}$, find the numerical value of $\frac{a^2}{b^3}$ 2016 Exam (6) Question (4) (b)
8	If $x = \frac{3}{4}$, $y = \frac{-3}{2}$, **then find the numerical value of :** $\left(\frac{x}{y}\right)^2$ 2018 Exam (4) Question (3) (a)
9	**Find the numerical value of the expression :** $3ab + 8a \div (4b)$ when $a = 4$, $b = -2$ Model 2018 Exam (1) Question (3) (b)
10	**Evaluate the numerical value of following expressions when $t = 2$, $a = 5$:** (1) $\frac{a-t}{a^3}$ (2) $\frac{6^2}{a-1}$ 2018 Exam (1) Question (4) (a)
11	If $t = 9$ and $s = 6$ **find the value of :** $16t - 4s + 3$ 2017 Exam (4) Question (4) (b)
12	**Find the value of :** $10 \times 4 - (2 \times 6 - 8)$ in its simplest form 2018 Exam (14) Question (4) (b)
13	**Calculate the value :** $(7-4) \times 2 \div (5-3)$ 2017 Exam (1) Question (3) (b)
14	**Find the value of expression :** $12 \times (2)^2 \div 24 + (-3)^2$ 2017 Exam (9) Question (4) (b)

15	**Use the rules of order of operations to find the result of :** $2 + 5^3 \div 5$ 2016 Exam (10) Question (3) (a)
16	If $x = \frac{-3}{2}$, $y = \frac{1}{2}$ and $z = \frac{-4}{3}$, then find the numerical value of the following in the simplest form : $x^2 - y z^2$ 2016 Exam (15) Question (3) (b)
17	**Calculate :** $2 [(5^2 + 1) - (4^2 - 1)]$ 2017 Exam (14) Question (3) (b)
18	**Simplify :** $\frac{n}{2}(3n - 6) + \frac{1}{3}(3 + 9n)$, then find its value when $n = 1$ 2016 Exam (8) Question (5) (a)
19	If $x = \frac{2}{5}$, $y = \frac{-2}{5}$ **Find the numerical value of :** $\left(\frac{x^2}{y^3}\right)^2$ 2016 Exam (8) Question (4) (b)
20	If $x = \frac{3}{4}$, $y = \frac{1}{3}$ **, then find the value of :** $(x^2 y^2)^{-3}$ 2018 Exam (5) Question (5) (a)
21	If $x = \frac{3}{4}$ and $y = -\frac{3}{2}$, then find the numericla value of : $(x^2 \div y^3)^2$ 2016 Exam (11) Question (5) (a)
22	If $x = 3$ and $y = 2$ **, then find the numerical value of :** $16x \div (4y) + 3xy$ 2018 Exam (6) Question (3) (a)
23	**Evaluate :** $\frac{16x}{4y} + 4xy$ for $x = 9$ and $y = 6$ 2017 Exam (12) Question (4) (a)
24	If $x = 9$ and $y = 6$ **, then find the numerical value of :** $16x \div (4y) + 3xy$ 2017 Exam (3) Question (3) (b)
25	**Find the value by using the order operation :** $8 \times 2^2 - 7 \times (4 + 1)$ 2017 Exam (5) Question (5) (b)
26	**Without using calculator find the value of :** $[(11) - (-10)] + 2 \times (-6)$ 2017 Exam (3) Question (3) (a)
27	**Write the following numbers in the standard form :** (1) 7 millions (2) 0.0006 2016 Exam (9) Question (4) (a)

Prep [1]

Algebra - Second Term

Unit [1] - Part [4]



Mr. Mahmoud Esmaiel

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الاسم ....

Lesson [6] : The Square Root

Definition :

The square root of the perfect square rational number «a» is the number whose square equals «a».

For example:

- The number 6 is a square root of the number 36 **because :** $6^2 = 36$
- Also , the number (– 6) is a square root of the number 36 **because :** $(-6)^2 = 36$

Generally

- The positive square root of the number a is symbolized by $\sqrt{a}$

  For example:

  The positive square root of 25 is $\sqrt{25} = 5$

- The negative square root of the number a is symbolized by $-\sqrt{a}$

  For example:

  The negative square root of 16 is $-\sqrt{16} = -4$

- The two square roots of the number a is symbolized by $\pm\sqrt{a}$ which means $\sqrt{a}$, $-\sqrt{a}$, and each of them is the additive inverse of the other.

  For example:

  The two square roots of 49 are $\pm\sqrt{49} = \pm 7$

Remarks

1. $\sqrt{0} = 0$
2. It is meaningless to find $\sqrt{a}$ if a is a negative rational number because there is no rational number if it is multiplied by itself , the result will be negative.
3. $\sqrt{a^2} = |a|$

   For example:

   - $\sqrt{(-3)^2} = |-3| = 3$
   - $\sqrt{\left(-\frac{4}{5}\right)^2} = \left|-\frac{4}{5}\right| = \frac{4}{5}$
4. $\sqrt{a^2 b^2} = \sqrt{(ab)^2} = |ab|$

   For example:

   $\sqrt{a^4 b^6} = \sqrt{(a^2 b^3)^2} = |a^2 b^3|$
5. If $x^2 = a$ where $a \geq 0$, then $x = \pm\sqrt{a}$

Exercises

[A] : Choose The Correct Answer : -

1	The square roots of 36 = ... (a) 6 (b) -6 (c) ± 6 (d) 18
2	$\sqrt{\frac{9}{49}}$ = ... (a) $\frac{2}{3}$ (b) $\frac{3}{7}$ (c) $\frac{1}{2}$ (d) 0.1
3	$\sqrt{16}$ = ... (a) 4 (b) ± 4 (c) 8 (d) ± 8
4	$\sqrt{\frac{25}{49}}$ = ... (a) $\frac{5}{7}$ (b) $\frac{-5}{7}$ (c) $\pm\frac{5}{7}$ (d) $\frac{7}{5}$
5	$\sqrt{\frac{4}{49}}$ = ... (a) $\frac{2}{7}$ (b) $\frac{3}{7}$ (c) $\frac{4}{49}$ (d) $\frac{1}{9}$
6	$\sqrt{\frac{4}{9}}$ = ... (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{9}{4}$
7	$\sqrt{100-64}$ = ... (a) ± 6 (b) 2 (c) $\lvert -6 \rvert$ (d) ± 2
8	$\sqrt{9+16}$ = ... (a) 7 (b) -7 (c) 5 (d) -5
9	$\sqrt{64+36}$ = ... (a) $\lvert -10 \rvert$ (b) ± 10 (c) 14 (d) -14
10	$\sqrt{(-5)^2}$ = ... (a) 25 (b) 5 (c) -5 (d) ± 5
11	$\sqrt{x^8}$ = ... (a) x^8 (b) x^5 (c) x^6 (d) x^4
12	$\sqrt{\left(\frac{-5}{6}\right)^2}$ = ... (a) $\frac{-5}{6}$ (b) $\frac{5}{6}$ (c) $\frac{25}{36}$ (d) meaningless

13	$\sqrt{(-8)^2+(-6)^2} = \ldots\ldots$ (a) $\lvert -10 \rvert$ (b) ± 10 (c) 14 (d) -14
14	$\sqrt{\sqrt{81}} = \ldots\ldots$ (a) 81 (b) 27 (c) 9 (d) 3
15	$\sqrt{100-(-6)^2} = \ldots\ldots$ (a) 4 (b) 8 (c) 2 (d) 16
16	$\sqrt{(-8)^2+(-6)^2} = \ldots\ldots$ (a) $\lvert -10 \rvert$ (b) ± 10 (c) 14 (d) -14
17	The number $\sqrt{0.09}$ is …… (a) natural. (b) positive integer. (c) negative integer. (d) rational.
18	$\sqrt{100-64} = 10 - \ldots\ldots$ (a) 8 (b) 6 (c) 4 (d) 2
19	$\sqrt{(-6)^2+(-8)^2} = 25 - \ldots\ldots$ (a) 15 (b) 10 (c) 6 (d) 8
20	$\sqrt{9}+\sqrt{4} = \sqrt{\ldots\ldots}$ (a) 13 (b) 5 (c) 25 (d) $\sqrt{13}$
21	The multiplicative inverse of the number $\sqrt{\frac{9}{16}}$ is …… (a) $\frac{-4}{3}$ (b) $\frac{-3}{4}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$
22	The multiplicative inverse of $\sqrt{\frac{10}{2.5}}$ is …… (a) 2 (b) 4 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
23	The multiplicative inverse of $\sqrt{\frac{100}{25}}$ is …… (a) $\pm\frac{10}{5}$ (b) $\pm\frac{5}{10}$ (c) $\frac{10}{5}$ (d) $\frac{5}{10}$
24	The multiplicative inverse of $\sqrt{\frac{4}{25}}$ in the simplest form is …… (a) $\frac{25}{4}$ (b) $\sqrt{\frac{5}{2}}$ (c) $\frac{5}{2}$ (d) $\frac{2}{5}$
25	The side length of a square whose area $9x^2$ cm.^{2} is …… cm. (a) $3x^2$ (b) $9x$ (c) $9x^2$ (d) $3x$
26	The side length of a square whose area is $49x^2$ cm.^{2} is …… cm. (a) 7 (b) $7x$ (c) $\pm 7x$ (d) $7x^2$

[B] : Complete the Following : -

1	$-\sqrt{4} =$ ……………
2	$\sqrt{100-64} =$ ……………
3	$\sqrt{16+9} = 4 +$ ……………
4	If $a = 0.0009$, then $\sqrt{a} = 3 \times 10^{\dots\dots}$
5	The multiplicative inverse of the number $\sqrt{\frac{4}{25}}$ is ……………
6	$\sqrt{25-9} =$ ……………
7	$\sqrt{(10)^2-(8)^2} = 10 -$ ……………
8	If $a = 0.000625$, then $\sqrt{a} =$ …………… in standard form.
9	The additive inverse of : $\sqrt{\frac{4}{9}} =$ ……………
10	$\sqrt{\frac{9}{25}} =$ …………… %
11	$\sqrt{\sqrt{16}} =$ ……………
12	$\sqrt{36} + \sqrt{16} = \sqrt{\dots\dots}$
13	The additive inverse of $\sqrt{\left(\frac{-2}{5}\right)^2}$ is ……………
14	$\sqrt{1\frac{11}{25}} =$ ……………
15	$\sqrt{(-8)^2+6^2} =$ ……………
16	$\sqrt{49x^2} =$ ……………

17	If $\frac{b}{8} = \frac{9}{2}$, then $\sqrt{b} =$ ....
18	$\sqrt{\frac{25x^2y^2}{36}} =$ .... (in the simplest form).
19	The additive inverse of the $\sqrt{\frac{4}{25}}$ is ....
20	$\sqrt{\frac{144}{169}} =$ ....
21	$\sqrt{6^2 + 8^2} =$ ....
22	$\sqrt{\frac{49a^4b^2}{9}} =$ ....
23	The additive inverse of the number $\sqrt{(-2)^2}$ is ....
24	If the area of a circle 49π cm^2 , then the radius length = ... cm.
25	$\sqrt{\frac{10}{2.5}} =$ ....
26	The value of $\sqrt{(6)^2 + 64} =$ ....
27	$\sqrt{25x^4} =$ ....
28	The additive inverse of the number $\sqrt{1\frac{9}{16}}$ is ....
29	The side length of a square whose area is $49x^2$ cm^2 is .... cm.
30	$\sqrt{\frac{16}{49}} =$ ....
31	$\sqrt{\left(\frac{-4}{9}\right)^2} =$ ....

[C] : Essay Problems : -

No.	Problem
1	**Find :** $\sqrt{\frac{49\,a^4\,b^2}{9}}$ 2017 Exam (3) Question (5) (a)
2	**Simplify :** $\left(\frac{-2}{5}\right)^2 \times \left(\frac{-3}{5}\right)^0 \times \sqrt{6\frac{1}{4}}$ 2016 Exam (3) Question (3) (a)
3	If $\frac{x}{27} = \frac{3}{x}$ Find the value of x 2018 Exam (10) Question (5) (b)
4	**Find the value of the expression in the simplest form :** $\frac{3}{4} \times \sqrt{\frac{81}{64}} \times \left(\frac{-2}{3}\right)^2$ 2016 Exam (6) Question (4) (a)
5	If $x = \frac{-2}{27}$, $y = \frac{-3}{2}$ **Find the numerical value of the expression :** $\sqrt{\frac{x}{y}}$ (in the simplest form). 2017 Exam (6) Question (3) (a)
6	**Simplify :** $\left(-\frac{3}{7}\right)^0 \times \left(-\frac{2}{5}\right)^2 \times \sqrt{6\frac{1}{4}}$ (Show steps) 2018 Exam (10) Question (4) (a)
7	**Find the value of the expression :** $\left(\frac{-1}{2}\right)^2 - \sqrt{0.25} + \left(\frac{-7}{9}\right)^0$ 2016 Exam (7) Question (4) (b)
8	**Find the value of the following :** $\left(\frac{-2}{3}\right)^{zero} \times \sqrt{\frac{16}{81}} \times \frac{3}{4}$ 2018 Exam (5) Question (4) (b)
9	**Find the value of :** $\sqrt{\left(\frac{-1}{9}\right)^2} + \sqrt{\frac{64}{81}} - \sqrt{\left(\frac{3}{7}\right)^0}$ 2017 Exam (1) Question (5) (a)
10	If $\frac{3}{4}$ of area of square $= 1\frac{11}{64}$ m^2. Find its perimeter. 2018 Exam (13) Question (3) (b)
11	**Find the result in the simplest form :** $\left(\frac{3}{4}\right)^{zero} \times \sqrt{\frac{81}{64}} \times \left(-\frac{2}{3}\right)^3$ 2016 Exam (2) Question (4) (a)
12	**Find the value of the expression in simplest form :** $\left(\frac{-1}{3}\right)^2 + \sqrt{\frac{64}{81}} - \left(\frac{3}{7}\right)^0$ 2017 Exam (12) Question (3) (a)

Homework

[A] : Choose The Correct Answer : -

1 The square roots of 36 = ...

(a) 6 (b) -6 (c) ± 6 (d) 18

2 $\sqrt{64+36}$ = ...

(a) $|-10|$ (b) ± 10 (c) 14 (d) -14

3 $\sqrt{100-64} = 10 -$ ....

(a) 8 (b) 6 (c) 4 (d) 2

4 If $\sqrt{\frac{a}{b}} = \frac{2}{3}$, then $\frac{b}{a}$ = ...

(a) $\frac{9}{4}$ (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{2}{3}$

5 $\sqrt{9+16}$ = ...

(a) 7 (b) -7 (c) 5 (d) -5

6 The number $\sqrt{0.09}$ is ....

(a) natural. (b) positive integer. (c) negative integer. (d) rational.

7 The side length of a square whose area is $49x^2$ cm.^{2} is .... cm.

(a) 7 (b) $7x$ (c) $\pm 7x$ (d) $7x^2$

8 $\sqrt{100-64}$ = ...

(a) ± 6 (b) 2 (c) $|-6|$ (d) ± 2

9 $\sqrt{(-8)^2+(-6)^2}$ = ...

(a) $|-10|$ (b) ± 10 (c) 14 (d) -14

10 The side length of a square whose area $9x^2$ cm.^{2} is .... cm.

(a) $3x^2$ (b) $9x$ (c) $9x^2$ (d) $3x$

11 $\sqrt{\frac{4}{9}}$ = ...

(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{9}{4}$

12 $\sqrt{100-(-6)^2}$ = ...

(a) 4 (b) 8 (c) 2 (d) 16

13 The multiplicative inverse of $\sqrt{\frac{10}{2.5}}$ is ....

(a) 2 (b) 4 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

No.	Question
14	The multiplicative inverse of $\sqrt{\frac{4}{25}}$ in the simplest form is .... (a) $\frac{25}{4}$ (b) $\sqrt{\frac{5}{2}}$ (c) $\frac{5}{2}$ (d) $\frac{2}{5}$
15	$\sqrt{\frac{4}{49}}$ = ... (a) $\frac{2}{7}$ (b) $\frac{3}{7}$ (c) $\frac{4}{49}$ (d) $\frac{1}{9}$
16	$\sqrt{\sqrt{81}}$ = ... (a) 81 (b) 27 (c) 9 (d) 3
17	The multiplicative inverse of $\sqrt{\frac{100}{25}}$ is .... (a) $\pm\frac{10}{5}$ (b) $\pm\frac{5}{10}$ (c) $\frac{10}{5}$ (d) $\frac{5}{10}$
18	$\sqrt{\frac{25}{49}}$ = ... (a) $\frac{5}{7}$ (b) $\frac{-5}{7}$ (c) $\pm\frac{5}{7}$ (d) $\frac{7}{5}$
19	$\sqrt{(-8)^2+(-6)^2}$ = ... (a) $\|-10\|$ (b) ± 10 (c) 14 (d) -14
20	$\sqrt{16}$ = ... (a) 4 (b) ± 4 (c) 8 (d) ± 8
21	$\sqrt{\left(\frac{-5}{6}\right)^2}$ = ... (a) $\frac{-5}{6}$ (b) $\frac{5}{6}$ (c) $\frac{25}{36}$ (d) meaningless
22	The multiplicative inverse of the number $\sqrt{\frac{9}{16}}$ is .... (a) $\frac{-4}{3}$ (b) $\frac{-3}{4}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$
23	$\sqrt{\frac{9}{49}}$ = ... (a) $\frac{2}{3}$ (b) $\frac{3}{7}$ (c) $\frac{1}{2}$ (d) 0.1
24	$\sqrt{x^8}$ = ... (a) x^8 (b) x^5 (c) x^6 (d) x^4
25	$\sqrt{9}+\sqrt{4}=\sqrt{\text{..........}}$ (a) 13 (b) 5 (c) 25 (d) $\sqrt{13}$
26	$\sqrt{(-5)^2}$ = ... (a) 25 (b) 5 (c) -5 (d) ± 5

[B] : Complete the Following : -

1	$-\sqrt{4} =$ ....
2	$\sqrt{100-64} =$ ....
3	$\sqrt{16+9} = 4 +$ ....
4	If $a = 0.0009$, then $\sqrt{a} = 3 \times 10^{\cdots\cdots}$
5	The multiplicative inverse of the number $\sqrt{\frac{4}{25}}$ is ....
6	$\sqrt{25-9} =$ ....
7	$\sqrt{(10)^2-(8)^2} = 10 -$ ....
8	If $a = 0.000625$, then $\sqrt{a} =$ .... in standard form.
9	The additive inverse of : $\sqrt{\frac{4}{9}} =$ ....
10	$\sqrt{\frac{9}{25}} =$ .... %
11	$\sqrt{\sqrt{16}} =$ ....
12	$\sqrt{36} + \sqrt{16} = \sqrt{\cdots\cdots}$
13	The additive inverse of $\sqrt{\left(\frac{-2}{5}\right)^2}$ is ....
14	$\sqrt{1\frac{11}{25}} =$ ....
15	$\sqrt{(-8)^2+6^2} =$ ....
16	The additive inverse of the number $\sqrt{(-2)^2}$ is ....

17	If the area of a circle 49 π cm^2, then the radius length = ... cm.
18	$\sqrt{\frac{25 x^2 y^2}{36}}$ = ... (in the simplest form).
19	The additive inverse of the $\sqrt{\frac{4}{25}}$ is ....
20	$\sqrt{\frac{144}{169}}$ = ...
21	$\sqrt{6^2+8^2}$ = ...
22	$\sqrt{\frac{49 a^4 b^2}{9}}$ = ...
23	$\sqrt{\frac{10}{2.5}}$ = ...
24	The value of $\sqrt{(6)^2+64}$ = ...
25	$\sqrt{25 x^4}$ = ...
26	The additive inverse of the number $\sqrt{1\frac{9}{16}}$ is ....
27	The side length of a square whose area is 49 x^2 cm^2 is .... cm.
28	$\sqrt{\frac{16}{49}}$ = ...
29	$\sqrt{\left(\frac{-4}{9}\right)^2}$ = ...
30	$\sqrt{49 x^2}$ = ...
31	If $\frac{b}{8}=\frac{9}{2}$, then $\sqrt{b}$ = ...
32	The side length of a square whose area is 9 x^2 cm.^{2} is ....

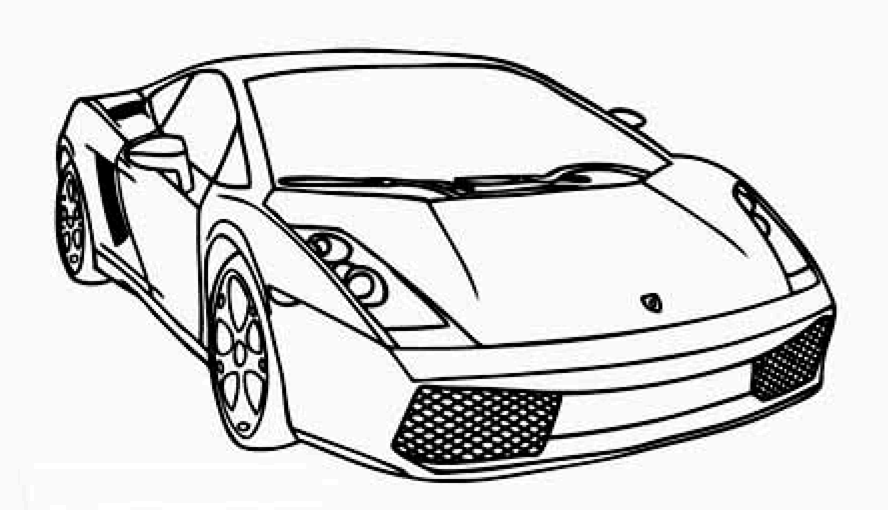
[C] : Essay Problems : -

1	**Find the value of the expression in simplest form :** $\left(\frac{-1}{3}\right)^2 + \sqrt{\frac{64}{81}} - \left(\frac{3}{7}\right)^0$ 2017 Exam (12) Question (3) (a)
2	**Find :** $\sqrt{\frac{25\,a^2 b^2}{36}}$ 2017 Exam (14) Question (4) (a)
3	If $(AB)^2 = 36\ cm^2$, $(BC)^2 = 121\ cm^2$ and $B \in \overline{AC}$, find the length of $\overline{AC}$ 2018 Exam (14) Question (3) (b)
4	**Simplify (with steps) :** $\left(\frac{-1}{3}\right)^2 \times \sqrt{\frac{81}{64}} \times \left(\frac{3}{7}\right)^0$ 2016 Exam (5) Question (3) (mm)
5	**Find :** $\sqrt{\frac{25\,x^2 y^4}{36\,a^6 b^8}}$ where $a \neq 0$, $b \neq 0$ 2017 Exam (15) Question (3) (a)
6	If $\frac{m}{n}$ is a rational number , $\frac{m^2}{n^2} = \frac{16}{100}$ evaluate $\left(\frac{m}{n}\right)^3$ 2018 Exam (1) Question (5) (b)
7	**Simplify to the simplest form :** $\left(\frac{-5}{3}\right)^2 \times \left(\frac{-4}{9}\right)^0 \times \sqrt{3\frac{6}{25}}$ 2018 Exam (6) Question (4) (b)
8	If $(AB)^2 = 144$, $(BC)^2 = 625$, $B \in \overline{AC}$ **find the length of :** $\overline{AC}$ 2017 Exam (11) Question (4) (a)
9	**Find the value of the expression :** $\left(\frac{3}{5}\right)^{zero} - \sqrt{\frac{49}{81}}$ 2017 Exam (9) Question (3) (a)
10	**Calculate the value of :** $\left(\frac{2}{3}\right)^2 \times \sqrt{\frac{81}{16}} \times \left(\frac{3}{2}\right)^{zero}$ 2016 Exam (14) Question (4) (a)
11	If $\frac{3}{4}$ of the area of a square is $1\frac{11}{64}\ m^2$. Find its side length. 2017 Exam (13) Question (5) (b)
12	ABC is a triangle in which $(AB)^2 = 16\ cm^2$, $(BC)^2 = 25\ cm^2$ **Find :** $BC - AB$ 2018 Exam (8) Question (3) (a)

Prep [1]

Algebra - Second Term

Unit [1] - Part [5]



Mr. Mahmoud Esmaiel

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Lesson [7] : Solving Equations

Prelude

The equation is a mathematical statement which contains one variable as x (or more as x and y) and contains equality relation « = »

as : $2x = 6$, $x + 3 = 5$, $2x - y = 3$ and $x^2 = 25$

The degree of the equation is determined by the heighest degree of the terms forming the equation.

For example:

- $5x + 2 = 7$ is an equation of the first degree in one unknown x
- $x^2 + x - 3 = 0$ is an equation of the second degree in one unknown x
- $2x + 3y = 5$ is an equation of the first degree in two unknowns x and y

Generally

If a , b and c are three rational numbers , then these numbers have the following properties :

1. If a = b , then a + c = b + c
2. If a + c = b + c , then a = b
3. If a = b , then a × c = b × c
4. If a × c = b × c , c ≠ 0 , then a = b

Using equations in solving word problems :

To solve the word problems in algebra , we translate the verbal statements into algebraic symbols and expressions , and the following table shows some examples for that.

Verbal statement	Algebraic expression
Two numbers , their sum is 9	x , $9 - x$
Two numbers , the difference between them is 4	x , $x - 4$ (or x , $x + 4$)
Two numbers , their product is 10	x , $\frac{10}{x}$
Two numbers , one of them is twice the other.	x , $2x$ (or x , $\frac{1}{2}x$)
Two numbers , one of them is third of the other.	x , $\frac{1}{3}x$ (or x , $3x$)
Eight subtracted from three times of a number.	$3x - 8$
Two numbers , one of them increases than twice of the other by 5	x , $2x + 5$
Three consecutive integers.	x , $x + 1$, $x + 2$
Three consecutive even numbers.	x , $x + 2$, $x + 4$
Three consecutive odd numbers.	x , $x + 2$, $x + 4$

Exercises

[A] : Choose The Correct Answer : -

1	If $3\,t = 6$, then $t =$ …………… (a) 6 (b) 3 (c) 2 (d) – 2
2	If $x + 9 = -11$, then $x =$ …………… (a) 2 (b) – 2 (c) 20 (d) – 20
3	$\left(\frac{4}{7}\right)^0 =$ …………… (a) 0 (b) 1 (c) $\frac{4}{7}$ (d) – 1
4	The multiplicative inverse of $(-1)^2$ …………… (a) – 1 (b) – 2 (c) 2 (d) 1
5	Which of the following is the smallest number ? (a) 314×10^3 (b) 3.14×10^4 (c) 31.4×10^5 (d) 0.314×10^8
6	$\frac{4\,a^2\,b^4}{2\,a^3\,b^3} =$ …………… (a) $2\,a\,b$ (b) $2\,a^5\,b^7$ (c) $\frac{2\,b}{a}$ (d) $\frac{2}{a\,b}$
7	The S.S. of the equation : $x + 3 = 3$ in $\mathbb{Z}$ is …………… (a) $\varnothing$ (b) $\{0\}$ (c) $\{3\}$ (d) $\{6\}$
8	The age of Aly now is x years , then his age 4 years ago is …………… years. (a) $4\,x$ (b) $4 + x$ (c) $4 - x$ (d) $x - 4$
9	$50000 = 5 \times 10^n$, $n =$ …………… (a) 6 (b) 5 (c) 4 (d) 3
10	If $5\,x = 35$, then $2\,x + 1$ …………… (a) 7 (b) 8 (c) 15 (d) 71
11	$3 \times 3^2 =$ …………… (a) 9 (b) 3^3 (c) 12 (d) 6
12	$\lvert -3 \rvert + \lvert 5 \rvert =$ …………… (a) – 8 (b) – 2 (c) 2 (d) 8
13	The number which in the standard form between the following numbers is …………… (a) 11×10^8 (b) 9.7×10^{-5} (c) 10.3×10^{-3} (d) 0.87×10^8
14	The standard form of quarter million is …………… (a) 0.25×10^6 (b) 0.25×10^4 (c) 2.5×10^5 (d) 25×10^4

No.	Question			
15	$6x - 1 = 11$, then $x =$			
	(a) 20	(b) 5	(c) 10	(d) 2
16	What is the best estimated of the fraction $\frac{1}{6}$?			
	(a) 15%	(b) 17%	(c) 20%	(d) 25%
17	If $x + 9 = 11$, then $2x =$			
	(a) 2	(b) 4	(c) 9	(d) 11
18	$\sqrt{a} + 4 = 6$, then the value of a is			
	(a) 2	(b) 16	(c) 32	(d) 4
19	The additive inverse of the number $(-3)^3$ is			
	(a) 27	(b) -27	(c) 9	(d) -9
20	$\frac{0.03}{0.01} =$			
	(a) 1	(b) 3	(c) 0.03	(d) 0.3
21	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, ... (In the same pattern)			
	(a) $\frac{1}{5}$	(b) $\frac{8}{9}$	(c) $\frac{15}{16}$	(d) $\frac{20}{25}$
22	If the number 1.7×10^{10} is written in full form , how many zeroes follow the 7 ?			
	(a) 9	(b) 10	(c) 11	(d) 12
23	$3^5 + 3^5 + 3^5 =$			
	(a) 9^5	(b) 9^{15}	(c) 3^{15}	(d) 3^6
24	$500000 = 5 \times 10^{......}$			
	(a) 3	(b) 4	(c) 2	(d) 5
25	If $4x = 20$, then $3x - 1 =$			
	(a) 14	(b) 15	(c) 16	(d) 17
26	$2^3 \times 2^3 =$			
	(a) 2^6	(b) 2^8	(c) 2^{15}	(d) 2^{53}
27	Quarter of $4^2 =$			
	(a) 16	(b) 2	(c) 1	(d) 4
28	$0.354 \times 100 =$			
	(a) 3.54	(b) 35.4	(c) 354	(d) 3540
29	If $a = 3$, $b = -2$, then the value of : $3ab =$			
	(a) zero	(b) 18	(c) -18	(d) 4
30	Half the number $2^{20} =$			
	(a) 2^{10}	(b) 2^{21}	(c) 2^{19}	(d) 40

[B] : Complete the Following : -

1	The solution set of the equation : $x - 1 = 5$ in $\mathbb{N}$ is ....
2	0.75×10^8 in the standard form is .... × ....
3	If $x + 7 = 8$, then $5x =$ ....
4	If $2x = 5$, then $6x - 5 =$ ....
5	If $2x + 7 = 3$, then $x =$ ....
6	If $2x + 3 = 15$, then $\frac{1}{3}x =$ ....
7	If $\frac{p}{4} = \frac{2}{3}$, then the value of $3p =$ ....
8	If $5x = 35$, then $2x + 1 =$ ....
9	The solution set of the equation : $-2x + 1 = -3$ in $\mathbb{Z}$ is ....
10	$\left(\frac{2}{7}\right)^5 \div \left(\frac{2}{7}\right)^3 =$ ....
11	The standard form of the number $0.7 \times 0.0005 =$ ....
12	If $x + 5 = 5$ in $\mathbb{Z}$, then the value of $4x =$ ....
13	If $2ab = 10$, then $ab =$ ....
14	If $2x = 0$, then $x + 9 =$ ....
15	If $2x = \sqrt{64}$, then $5x =$ ....
16	The S.S. of the equation $x + 17 = 13$, $x \in \mathbb{N}$ is ....
17	If $5x = 10$, then $x + 1 =$ ....
18	$\frac{1}{9}$, $\frac{1}{8}$, $\frac{1}{7}$, ... , ... (In the same pattern).

19	If $\left(\frac{5}{6}\right)^n = \frac{25}{36}$, then n = ...
20	The standard form of the number 0.7×0.005 = ...
21	If $x + 5 = 1$, then the S.S. in $\mathbb{N}$ is ....
22	If $x + 5 = 7$, then $3x + 4$ = ...
23	If $x + 2 = 6$, then x = ...
24	If $x + 1 = 2$, then $2x$ = ...
25	If $x + 9 = 10$, then the value of $7x$ = ...
26	The multiplicative inverse of 7 = ...
27	3 , 5 , 7 , 9 , ... (in the same pattern)
28	Quarter of 4^{20} equals $4^{\text{...............}}$
29	The standard form of 0.000057 = ...
30	If $x = -2$ and $y = 3$, then x^y = ...
31	If A = 0.000625 , then $\sqrt{A} = 2.5 \times 10^{\text{...............}}$
32	If $5000 = 5 \times 10^n$, then n = ...
33	The number 420×10^4 in the standard form is ....
34	$\left(\frac{-2}{3}\right)^0$ = ...
35	$\lvert 6 \rvert + \lvert -6 \rvert$ = ...
36	(1 , 2 , 3 , 5 , 8 , 13 , ... , ... (in the same pattern)
37	$2^2 \times 2 = 2^{\text{.....}}$ = ...

[C] : Essay Problems : -

1	**Find in $\mathbb{Z}$ the solution set of the equation :** $2x + 9 = 1$ 2016 Exam (1) Question (3) (b)
2	**Find in $\mathbb{Q}$ the S.S. of the equation :** $3x + 2 = 11$ 2016 Exam (13) Question (3) (b)
3	**Find the S.S. of each of the following :** $5x - 6 = 34$ 2018 Exam (15) Question (3) (a)
4	**Find the S.S. of each of the following :** $5x + 8 = 13 - 2x$ 2018 Exam (8) Question (4) (a)
5	What is the number which we add 6 to its twice , then the result equals 14 ? 2017 Exam (8) Question (5) (a)
6	Three consecutive even numbers their sum = 204 , find these numbers. 2018 Exam (12) Question (3) (a)
7	If the length of a rectangle is twice its width and its perimeter equals 36 cm. Calculate its area. 2016 Exam (7) Question (4) (a)
8	**Find in $\mathbb{Q}$ the S.S. of the following :** $3x + 1 = 25$ Model 2018 Exam (1) Question (4) (a) (1)
9	**Find the S.S. in $\mathbb{Q}$:** $5x + 4 = 39$ 2016 Exam (4) Question (3) (b) (1)
10	**Find the S.S. of each of the following :** $5x - 4 = 2x + 11$ where $x \in \mathbb{Q}$ 2017 Exam (5) Question (3) (a)
11	**Find the S.S. of each of the following :** $5x - 2 = 2(x + 5)$, $x \in \mathbb{Q}$ 2018 Exam (10) Question (3) (a)
12	Three odd consecutive numbers there sum is 195 , find these number. 2017 Exam (6) Question (4) (a)
13	If the length of rectangle 5 cm. more than its width and its perimeter = 26 cm. find the area of rectangle. 2018 Exam (10) Question (4) (b)
14	**Find in $\mathbb{Q}$ the S.S. of the equation :** $3x - 1 = 5$ 2016 Exam (14) Question (3) (a)
15	**Find the solution set of the following equation in $\mathbb{Q}$:** $5x + 4 = 6$ 2017 Exam (10) Question (4) (a)
16	**Find the S.S. of the equation :** $5x + 8 = 13 - 2x$, $x \in \mathbb{Q}$ 2017 Exam (11) Question (5) (a)
17	**Find the S.S. of each of the following :** $4(x - 1) = x + 3$

	2018 Exam (13) Question (3) (a)
18	The sum of three consecutive even numbers is 60 , find them. 2018 Exam (3) Question (5) (a)
19	The sum of the ages of 3 brothers now is 55 years. If the eldest was born before the middle by 3 years and the middle was born before the youngest by two years. Find the age of each of them. 2018 Exam (13) Question (4) (a)
20	If $x \in \mathbb{Q}$, **find the S.S. of the following equation :** $3x - 1 = 14$ 2018 Exam (4) Question (4) (a)
21	**Find in $\mathbb{Q}$ the S.S. of the following equation :** $3 - 4x = -5$ 2018 Exam (11) Question (3) (a)
22	**Find S.S. in $\mathbb{Q}$:** $3x - 4 = 2x + 5$ 2018 Exam (2) Question (4) (a)
23	**Find in $\mathbb{Q}$ the solution set of the equation :** $3(x + 2) + 7x - 5 = 9$ 2017 Exam (8) Question (3) (b)
24	The sum of three consecutive numbers is 12 find these numbers. 2017 Exam (4) Question (3) (b)
25	**Find in $\mathbb{Q}$ the S.S. of the following :** $(3x + 2) + 5 = 13$ Model 2018 Exam (2) Question (4) (a) (1)
26	If we add a number to its double the result equal 36 , then find this number. 2016 Exam (1) Question (5) (b)
27	Three consecutive integers their sum is 213 , find the greatest integer. (Write an equation , then solve it). 2016 Exam (3) Question (4) (a)
28	If the length of a rectangle is twice its width and the width increases by 6 cm. and the length decreases by 5 cm. , it will become a square , find the area of the rectangle. 2017 Exam (11) Question (3) (b)
29	Two natural numbers , one of them is twice the other and their sum is 108 Find the two numbers. 2018 Exam (9) Question (3) (b)

Homework

[A] : Choose The Correct Answer : -

1	Which of the following is the greatest ?			
	(a) 33%	(b) 0.5	(c) $\frac{1}{5}$	(d) 0.25
2	If 2 a b = 10 , then ab = ...			
	(a) $\frac{2}{10}$	(b) 8	(c) 5	(d) 20
3	If $\frac{26}{x} + 1 = 14$, then x = ...			
	(a) 2	(b) 3	(c) 26	(d) 13
4	$2^3 \times 2^5$ = ...			
	(a) 2^2	(b) 2^8	(c) 2^{15}	(d) 2^{53}
5	Quarter of 4^{20} equals			
	(a) 4^5	(b) 4^{10}	(c) 4^{19}	(d) 1^{20}
6	$\left(\frac{-5}{6}\right)^2 \div 3\frac{3}{4}$ = ...			
	(a) $\frac{-5}{27}$	(b) $\frac{5}{27}$	(c) $\left(\frac{5}{27}\right)^2$	(d) $\frac{27}{5}$
7	The number 750000 is written in its scientific notation as 7.5×10^n , then n = ...			
	(a) 4	(b) 5	(c) – 4	(d) – 5
8	$6 \div 3^0$ = ...			
	(a) 2	(b) 3	(c) 0	(d) 6
9	$3^{10} + 3^{10} + 3^{10}$ = ...			
	(a) 3^{10}	(b) 3^{11}	(c) 3^{20}	(d) 3^{30}
10	7.35×10^{-4} = ...			
	(a) 0.000735	(b) 0.00735	(c) 0.0735	(d) 7350
11	If 3 t = 6 , then the value of 6 t = ...			
	(a) 2	(b) 12	(c) 3	(d) 6
12	If $x = \sqrt{\frac{1}{9}}$, then x^3 = ...			
	(a) $\frac{1}{3}$	(b) $\frac{1}{27}$	(c) $\frac{1}{9}$	(d) $\frac{1}{81}$
13	If $x = y$, then $\left(\frac{3}{5}\right)^{x-y}$ = ...			
	(a) 0	(b) 1	(c) $\frac{3}{5}$	(d) $\frac{5}{3}$

No.	Question			
14	Half of 4^{20} = ...			
	(a) 4^{19}	(b) 2^{20}	(c) 4^{39}	(d) 2^{39}
15	The value of 7 in the number 4375 is			
	(a) 0.7	(b) 7	(c) 70	(d) 700
16	The age of Amr now is x years , then his age 5 years ago is .... years.			
	(a) $5x$	(b) $x+5$	(c) $5-x$	(d) $x-5$
17	Half of 2^{10} = ...			
	(a) 2^9	(b) 2^5	(c) 1^{10}	(d) 1^5
18	The prime number is			
	(a) 0	(b) 1	(c) 2	(d) – 2
19	If $x+7=11$, then the value of $7x$ = ...			
	(a) 7	(b) 21	(c) 14	(d) 28
20	If $3x=12$, then $4x+1$ = ...			
	(a) 9	(b) 37	(c) 17	(d) 49
21	If $\frac{6x}{5}=-2$, then x^2 = ...			
	(a) $\frac{-25}{9}$	(b) $\frac{5}{9}$	(c) $\frac{25}{9}$	(d) $\frac{25}{3}$
22	If a = b , then $\left(\frac{3}{7}\right)^{b-a}$ equal			
	(a) zero	(b) 1	(c) $\frac{3}{7}$	(d) $\frac{7}{3}$
23	$3^x+3^x+3^x$ = ...			
	(a) 3^x	(b) 27^x	(c) $3x^3$	(d) 3^{x+1}
24	If $3x+1=25$, then x = ...			
	(a) 7	(b) 8	(c) 5	(d) 4
25	$\left(\frac{-2}{3}\right)^2$ = ...			
	(a) $\frac{4}{9}$	(b) $\frac{-4}{9}$	(c) $\frac{4}{6}$	(d) $\frac{-4}{6}$
26	3 + 3 + 3 = ...			
	(a) 3^0	(b) 3^1	(c) 3^2	(d) 3^3
27	Which of the following is the greatest ?			
	(a) 2.3×10^4	(b) 2.3×10^5	(c) 3.2×10^4	(d) 3.2×10^5
28	If $x+9=11$, then $7x$ = ...			
	(a) – 2	(b) 2	(c) 14	(d) 15
29	$\frac{6x}{5}=-6$, then x^2 = ...			
	(a) 10	(b) –5	(c) – 10	(d) 25

[B] : Complete the Following : -

1	0.00037 in scientific notation = ……………
2	✱ If $0.0006 = 6 \times 10^{n}$, then n = ……………
3	$0.00037 = 3.7 \times 10^{n}$, then n = ……………
4	$\frac{a^2}{b^2} \times \left(\frac{b}{c}\right)^2 =$ …………… in the simplest form where $b \neq 0$ and $c \neq 0$
5	$2.37 \times 10^{-4} =$ ……………
6	If $7 - 2x = 3$, then $x =$ …………… where $x \in \mathbb{Q}$
7	$3^{zero} =$ ……………
8	If a = b , then $\left(\frac{3}{11}\right)^{a-b} =$ ……………
9	1 , 1 , 2 , 3 , 5 , 8 , …………… , …………… (in its same pattern)
10	If $x = y$, then $5^{x-y} =$ ……………
11	If a = b , then $7^{b-a} =$ ……………
12	The term whose order is 50th in the pattern $\left(\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \cdots\right)$ is ……………
13	$\frac{1}{9}, \frac{1}{8}, \frac{1}{7}$, …………… , …………… (In the same pattern).
14	If $2^{x} = 3$, then $4^{x} =$ ……………
15	$5x = 40$, then $\sqrt{x+1} =$ ……………
16	The S.S in $\mathbb{N}$ of $3x + 7 = 4$ is ……………
17	If we subtract twice the number x from 3 , then the result is ……………
18	If $x + 9 = 11$, then the value of $7x =$ ……………

19	If $3x = 15$, then $2x + 1 =$ ....
20	The multiplicative inverse of $\left(\frac{-2}{3}\right)^2$ is ....
21	If $\frac{P}{2} = 4$, $\frac{Q}{3} = 1$, then P : Q = ... : ....
22	$459.799 \simeq$ .... to the nearest tenth
23	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{3y} =$ ....
24	If $\frac{x}{y} = \frac{7}{2}$, then $\frac{2x}{7y} =$ ....
25	$\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{15}{16}$, ... , ... (In the same pattern)
26	If $3x + 1 = 16$, then the value of $4x =$ ....
27	If the age of Omar now is x years , then his age after 3 years is .... years.
28	The additive inverse of $\left(\frac{-2}{3}\right)^0$ is ....
29	The additive inverse of $(-1)^3 =$ ....
30	The additive inverse of $\left(\frac{\sqrt{2}}{3}\right)^0 =$ ....
31	$(x - 2)^{zero} = 1$ if $x \neq$ ....
32	If $\frac{x}{y} = \frac{3}{2}$, then $\frac{2x}{5y} =$ .... = ...
33	If $k + 7 = 10$, then the value of $8k =$ ....
34	If $2x = \sqrt{36}$, then $3x - 4 =$ ....
35	$3x - 1 = -4$ where $x \in \mathbb{N}$, then the S.S. = ...

[C] : Essay Problems : -

1	**Find the S.S. of each of the following :** $3x - 5 = 7$ 2018 Exam (3) Question (3) (a)
2	**Find in $\mathbb{Q}$ the S.S. of the equation :** $4x + 7 = 13$ 2016 Exam (3) Question (5) (b)
3	**Solve the equation :** $3x + 12 = 8 - 2x$ where $x \in \mathbb{Q}$ 2017 Exam (9) Question (3) (b)
4	**Find the S.S. of each of the following :** $3(x + 2) + 1 = 15$ 2018 Exam (9) Question (3) (a)
5	If the middle number of three consecutive natural numbers is x and the sum of them is 12 , find the three numbers. 2017 Exam (10) Question (5) (b)
6	Two natural numbers one of them is twice the other and their sum is 45. Find the two numbers. 2018 Exam (11) Question (4) (b)
7	**Find in $\mathbb{Q}$ the solution set of the equation :** $3x - 5 = 10$ 2017 Exam (12) Question (5) (a)
8	**Find in $\mathbb{Q}$ the S.S. of the equation :** $3x + 5 = -4$ 2016 Exam (6) Question (3) (b)
9	**Find the S.S. of :** $3x + 1 = x + 2 \quad , x \in \mathbb{Q}$ 2017 Exam (6) Question (5) (a)
10	**Find the S.S. of each of the following :** $3(x + 2) = 12$ 2018 Exam (5) Question (3) (a)
11	The sum of two consecutive numbers is 97 Find the two numbers. 2016 Exam (4) Question (4) (b)
12	Two natural numbers , one of them is twice the other and their sum is 21 what are that two numbers ? 2017 Exam (5) Question (4) (a)
13	**Find the S.S. of each of the following :** $8 + 2x = 14$ 2018 Exam (1) Question (3) (B)
14	**Find the S.S. of each of the following :** $3x + 3 = 27$ 2017 Exam (10) Question (5) (a)
15	**Find the S.S. of each of the following :** $2x + 8 = 13 - 5x$ 2018 Exam (6) Question (5) (a)

16	**Solve the equation :** $3(x+2)+1=19$, $x \in \mathbb{N}$ 2017 Exam (13) Question (3) (a)
17	Find the number that if added to its 3 times the result will be 28 ? 2018 Exam (8) Question (5) (a)
18	Two integers , the smaller one is $2x$ and the greater is $5x$, if the difference between them is 30 , find the two numbers. 2018 Exam (5) Question (4) (a)
19	The lenght of a rectangle exceeds its width by 4 metres and its perimeters is 68 metres Find the dimensions of the rectangle. 2017 Exam (15) Question (4) (a)
20	**Find in $\mathbb{N}$ the solution set of the equation :** $2x+1=5$ 2016 Exam (10) Question (3) (b)
21	**Find in $\mathbb{Q}$ the S.S. of the following :** $3x+3=8$ 2018 Exam (7) Question (3) (a)
22	**Find the S.S. of each of the following :** $\frac{5}{6}x-4=11$ 2018 Exam (7) Question (3) (a)
23	**Find in $\mathbb{Q}$ the solution set of the equation :** $3(x+2)+7(x-1)=12$ 2016 Exam (2) Question (4) (b)
24	What is the number which if we add it to its three times the result is 24 ? 2018 Exam (4) Question (4) (b)
25	The sum of three consecutive even numbers is 966 , find these numbers. 2017 Exam (3) Question (5) (b)
26	The length of a rectangle exceeds its width by 4 metres and its perimeter is 64 metres. Find the dimensions of this rectangle. 2016 Exam (5) Question (4) (b)
27	**Find the S.S. of each of the following :** $3x+2=4$ 2017 Exam (14) Question (3) (a)
28	**Find in $\mathbb{Q}$ the S.S. of the equation :** $7x+4=5$ 2017 Exam (4) Question (3) (a)

Prep [1]

Algebra - Second Term

Unit [1] - Part [6]



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Lesson [8] : Solving Inequalities in Q

We can summarize the properties of inequality that noticed before as follows :

Assuming that a , b , c are three rational numbers , then :

1. If $a < b$, then $a + c < b + c$
2. If $a < b$, then $a - c < b - c$
3. If $a < b$, c is a positive number , then $ac < bc$
4. If $a < b$, c is a positive number , then $\frac{a}{c} < \frac{b}{c}$
5. If $a < b$, c is a negative number , then $ac > bc$
6. If $a < b$, c is a negative number , then $\frac{a}{c} > \frac{b}{c}$

Remark :

If a and b are two non-zero rational numbers have the same sign and $a > b$, then : $\frac{1}{a} < \frac{1}{b}$

We notice from the previous example that :

The solution set of the inequality depends on the substitution set , we find that :

The solution set in $\mathbb{N}$ differs from the solution set in $\mathbb{Z}$

Example 4 **Find in $\mathbb{Z}$ the solution set of the inequality $-11 \le 3x - 5 < 4$, then represent it on the number line.**

Solution

$\because -11 \le 3x - 5 < 4$

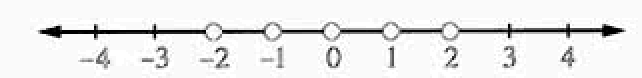
Adding 5 to the three sides

$\therefore -11 + 5 \le 3x - 5 + 5 < 4 + 5$ $\qquad \therefore -6 \le 3x < 9$

Dividing all sides by 3

$\therefore \frac{-6}{3} \le \frac{3x}{3} < \frac{9}{3}$ $\qquad \therefore -2 \le x < 3$

i.e. The S.S. $= \{-2 , -1 , 0 , 1 , 2\}$



Exercises

[A] : Choose The Correct Answer : -

No.	Question
1	If $a > b$, then $a - c$ .... $b - c$ (a) $>$ (b) $\geq$ (c) $<$ (d) $\leq$
2	The S.S. of the inequality : $3x + 2 < 4$ in $\mathbb{N}$ is .... (a) $\{0\}$ (b) $\varnothing$ (c) $\{\frac{2}{3}\}$ (d) $\{0 , \frac{2}{3}\}$
3	If $-x > 4$, then .... (a) $x > -4$ (b) $x > 4$ (c) $x < -4$ (d) $x < 4$
4	$\sqrt{16} =$ .... (a) 4 (b) ± 4 (c) 8 (d) ± 8
5	$\sqrt{x^8} =$ .... (a) x^8 (b) x^5 (c) x^6 (d) x^4
6	$\sqrt{(-6)^2 + (-8)^2} = 25 -$ .... (a) 15 (b) 10 (c) 6 (d) 8
7	If $\sqrt{\frac{a}{b}} = \frac{2}{3}$, then $\frac{b}{a} =$ .... (a) $\frac{9}{4}$ (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{2}{3}$
8	If $3a = \sqrt{4}\, b$, then $\frac{a}{b} =$ .... (a) 2 : 3 (b) 3 : 2 (c) 3 : 4 (d) 4 : 3
9	The S.S. of the inequality : $2x + 1 \geq 1$ in $\mathbb{N}$ is .... (a) $\mathbb{Z}_+$ (b) $\varnothing$ (c) $\mathbb{N}$ (d) $\{0\}$
10	If $x \in \mathbb{Z}$, $-x \geq 4$, then .... (a) $x \geq -4$ (b) $x \leq -4$ (c) $x \geq 4$ (d) $x \leq 4$
11	$\sqrt{\frac{9}{49}} =$ .... (a) $\frac{2}{3}$ (b) $\frac{3}{7}$ (c) $\frac{1}{2}$ (d) 0.1
12	$\sqrt{(-5)^2} =$ .... (a) 25 (b) 5 (c) -5 (d) ± 5
13	$\sqrt{100 - 64} = 10 -$ .... (a) 8 (b) 6 (c) 4 (d) 2

No.	Question
14	The side length of a square whose area is 49 x^2 cm.^{2} is .... cm. (a) 7 (b) 7 x (c) ± 7 x (d) 7 x^2
15	$16 \div 2 \times 3 - 9 =$ .... (a) 2 (b) $\frac{16}{3}$ (c) 10 (d) 15
16	If a – 3 < 0 , then a .... 3 (a) < (b) = (c) > (d) ≥
17	If $-x > 3$, then .... (a) $x > -3$ (b) $x > 3$ (c) $x < -3$ (d) $x < 3$
18	The square roots of 36 = ... (a) 6 (b) – 6 (c) ± 6 (d) 18
19	$\sqrt{64 + 36} =$ .... (a) $\|-10\|$ (b) ± 10 (c) 14 (d) – 14
20	The number $\sqrt{0.09}$ is .... (a) natural. (b) positive integer. (c) negative integer. (d) rational.
21	The side length of a square whose area 9 x^2 cm.^{2} is .... cm. (a) 3 x^2 (b) 9 x (c) 9 x^2 (d) 3 x
22	$9 + 4 \times 3^2 =$ .... (a) 45 (b) 117 (c) 24 (d) 33
23	$\frac{x}{2} < 5$ equivalent .... (a) $x < \frac{5}{2}$ (b) $x > \frac{5}{2}$ (c) $x < 10$ (d) $x > 10$
24	If $-x < 3$, then .... (a) $x > 3$ (b) $x > -3$ (c) $x < 3$ (d) $x < -3$
25	If $-2x \geq 1$, $x \notin \mathbb{N}$, then .... (a) The S.S. = ∅ (b) $x \leq \frac{1}{2}$ (c) $x \geq \frac{1}{2}$ (d) $x \geq 2$
26	$\sqrt{9 + 16} =$ .... (a) 7 (b) – 7 (c) 5 (d) – 5
27	$\sqrt{(-8)^2 + (-6)^2} =$ .... (a) $\|-10\|$ (b) ± 10 (c) 14 (d) – 14

[B] : Complete the Following : -

1	If $x + 2 \geq 7$, then $x \geq$ ....
2	If $-x > 4$, then $x <$ ....
3	$3 \times 4 - 4 \div 2 =$ ....
4	$25 \div (4 + 1) =$ ....
5	$\sqrt{1\frac{11}{25}} =$ ....
6	$\sqrt{6^2 + 8^2} =$ ....
7	$\sqrt{25\,x^4} =$ ....
8	If $\frac{b}{8} = \frac{9}{2}$, then $\sqrt{b} =$ ....
9	If $2\,x = \sqrt{9}\,y$, then $\frac{x}{y} =$ ....
10	The S.S. of the inequality : $2 < x \leq 5$ in N is ....
11	$2 \times 6 - 4 \div 2 =$ ....
12	$7\,(6^2 - 5 \times 6) =$ ....
13	$\sqrt{\frac{144}{169}} =$ ....
14	The value of $\sqrt{(6)^2 + 64} =$ ....
15	$\sqrt{49\,x^2} =$ ....
16	If $a^2 = 36$, then a = ...

17	The multiplicative inverse of the number $-\sqrt{\frac{9}{16}}$ = ...
18	The S.S. of the inequality : $2 < x \leq 4$ in $\mathbb{N}$ is ....
19	The S.S. of inequality : $-3x < 6$ in $\mathbb{Z}$ is ....
20	The value of : $5 [(2^2 - 1) - (2^2 - 3)]$ = ...
21	$\sqrt{\frac{10}{2.5}}$ = ...
22	$\sqrt{\left(\frac{-4}{9}\right)^2}$ = ...
23	$\sqrt{4^2 + 3^2} = 4 +$ ....
24	If a = 0.000225 , then $\sqrt{a} = 1.5 \times 10^{\cdots\cdots}$
25	The multiplicative inverse of the number $\sqrt{\frac{4}{25}}$ is ....
26	$3x + 5 \geq 10$ where $x \in \mathbb{Q}$, then S.S. = ...
27	If $-2x > 8$, then S.S. in $\mathbb{Z}$ = ...
28	The value of : $5 \times 6 - 4 \div 2$ = ...
29	$\sqrt{\frac{16}{49}}$ = ...
30	$\sqrt{\left(\frac{2}{5}\right)^2}$ = ...
31	$\sqrt{9 + 16} = 3 +$ ....
32	If a = 0.0009 , then $\sqrt{a} = 3 \times 10^{\cdots\cdots}$
33	The additive inverse of : $\sqrt{\frac{4}{9}}$ = ...

[C] : Essay Problems : -

1. **Find the solution set of the inequality :** $-4x \geq -8$, where $x \in \mathbb{Q}$
   2016 Exam (5) Question (5) (a)
2. **Find in $\mathbb{Q}$ the S.S. of the inequality :** $2x - 3 \leq 7$
   2016 Exam (6) Question (5) (a)
3. **Find in $\mathbb{Q}$ the S.S. of the inequality :** $2x + 5 < 9$
   2016 Exam (13) Question (4) (b)
4. **Find S.S. in $\mathbb{Q}$ of the inequality :** $3x + 2 > -1$
   2018 Exam (9) Question (4) (b)
5. **Find in $\mathbb{N}$ the S.S. of the inequality :** $2 < x + 1 \leq 4$
   2017 Exam (5) Question (4) (b)
6. **Find in $\mathbb{Q}$ the S.S. of the inequality :** $2x + 3 \leq 7$
   2016 Exam (9) Question (4) (b)
7. **Find in $\mathbb{Q}$ the S.S. of the following :** $2x + 5 < 16$
   Model 2018 Exam (1) Question (4) (a) (1)
8. **If $x \in \mathbb{Q}$, find the S.S. of the following inequality :** $3x - 2 < 7$
   2018 Exam (4) Question (5) (a)
9. **Solve the inequality :** $1\frac{1}{2} > x - 2\frac{1}{2}$ in $\mathbb{N}$
   2017 Exam (13) Question (5) (a)
10. **Solve the inequality in $\mathbb{Q}$:** $-3m + 6(m - 4) > 9$
    2017 Exam (15) Question (5) (a)
11. **Find in $\mathbb{Q}$ the solution set of the inequality :** $2x - 1 \geq 5$
    2018 Exam (14) Question (4) (a)
12. **Find in $\mathbb{Q}$ the S.S. of :** $2x + 4 \geq 1$
    2017 Exam (4) Question (4) (a)
13. **Find in $\mathbb{Z}$ the S.S. of the inequality :** $3 - 2x \geq 1$
    2016 Exam (11) Question (3) (b)
14. **Find the solution set of the following inequality :** $5x + 1 \leq 29$, $x \in \mathbb{Q}$
    2017 Exam (3) Question (4) (a)
15. **Find in $\mathbb{Q}$ the S.S. of the inequality :** $3(x + 2) < -x + 4$
    2016 Exam (3) Question (3) (b)
16. **Find the S.S. of the inequality :** $2x + 1 \leq 9$, where $x \in \mathbb{Q}$
    2016 Exam (1) Question (4) (b)
17. **Find the S.S. of each of the following :** $3 - 2x \geq 1$
    2018 Exam (13) Question (3) (a)

Homework

[A] : Choose The Correct Answer : -

1	The multiplicative inverse of $\sqrt{\frac{4}{25}}$ in the simplest form is .... (a) $\frac{25}{4}$ (b) $\sqrt{\frac{5}{2}}$ (c) $\frac{5}{2}$ (d) $\frac{2}{5}$
2	$6 \times 2 - 4 \div 2 =$ .... (a) 1 (b) 2 (c) 10 (d) 12
3	The S.S. of the inequality $x < 0$ in $\mathbb{N}$ is .... (a) $\{0\}$ (b) $\{1\}$ (c) $\{0, 1\}$ (d) $\varnothing$
4	If $-x \geq -1$, then .... (a) $x \leq -1$ (b) $x \geq 1$ (c) $x \leq 1$ (d) $x \geq -1$
5	If $-2x < 4$, then .... (a) $x < -2$ (b) $x < -6$ (c) $x < 2$ (d) $x > -2$
6	$\sqrt{100 - 64} =$ .... (a) ± 6 (b) 2 (c) $\vert -6 \vert$ (d) ± 2
7	$\sqrt{100 - (-6)^2} =$ .... (a) 4 (b) 8 (c) 2 (d) 16
8	The multiplicative inverse of $\sqrt{\frac{100}{25}}$ is .... (a) $\pm \frac{10}{5}$ (b) $\pm \frac{5}{10}$ (c) $\frac{10}{5}$ (d) $\frac{5}{10}$
9	$5 \times 4 - 8 \div 2 =$ .... (a) 16 (b) 6 (c) 14 (d) 18
10	The solution set of the inequality : $x < 2$ in $\mathbb{N}$ is .... (a) $\{0\}$ (b) $\{1\}$ (c) $\{0, 1\}$ (d) $\varnothing$
11	The S.S. of the inequality : $-x \geq 1$ in $\mathbb{N}$ is .... (a) $\{0\}$ (b) $\{0, 1\}$ (c) $\{1\}$ (d) $\varnothing$
12	If $-2x > 6$, then x .... -3 (a) $<$ (b) $=$ (c) $>$ (d) $\leq$
13	$2 \times 6 - 4 \div 2 =$ .... (a) 10 (b) 4 (c) 2 (d) 1

14	$\sqrt{9}+\sqrt{4}=\sqrt{\dots\dots}$ (a) 13 (b) 5 (c) 25 (d) $\sqrt{13}$
15	$\sqrt{\frac{4}{9}}=\dots\dots$ (a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{4}{9}$ (d) $\frac{9}{4}$
16	$\sqrt{\sqrt{81}}=\dots\dots$ (a) 81 (b) 27 (c) 9 (d) 3
17	The multiplicative inverse of $\sqrt{\frac{10}{2.5}}$ is …… (a) 2 (b) 4 (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
18	$3\times 6-4\div 2=\dots\dots$ (a) 3 (b) 7 (c) 16 (d) 20
19	If $x<4$, then $-x$ …… -4 (a) $<$ (b) $>$ (c) $\le$ (d) $\ge$
20	If $x\in\mathbb{Z}$, then S.S. of the inequality : $20<5x<25$ …… (a) $\{4\}$ (b) $\{5\}$ (c) $\{4,5\}$ (d) $\varnothing$
21	The S.S. of the inequality : $-2x<$ zero in $\mathbb{Q}$ is …… (a) $\mathbb{Q}$ (b) $\mathbb{Q}_+$ (c) $\mathbb{Q}_-$ (d) $\mathbb{Z}_+$
22	$\sqrt{\frac{4}{49}}=\dots\dots$ (a) $\frac{2}{7}$ (b) $\frac{3}{7}$ (c) $\frac{4}{49}$ (d) $\frac{1}{9}$
23	$\sqrt{(-8)^2+(-6)^2}=\dots\dots$ (a) $\lvert -10\rvert$ (b) ± 10 (c) 14 (d) -14
24	The multiplicative inverse of the number $\sqrt{\frac{9}{16}}$ is …… (a) $\frac{-4}{3}$ (b) $\frac{-3}{4}$ (c) $\frac{3}{4}$ (d) $\frac{4}{3}$
25	$2\times 6-4\times 2=\dots\dots$ (a) 4 (b) 8 (c) 10 (d) 2
26	The S.S. of the inequality $2x+1\ge 0$ in $\mathbb{N}$ is …… (a) $\mathbb{Z}_+$ (b) $\varnothing$ (c) $\mathbb{N}$ (d) $\{0\}$
27	If $-x<5$, then x …… -5 (a) $<$ (b) $\le$ (c) $\ge$ (d) $>$

[B] : Complete the Following : -

1	If $3x + 1 \ge 10$, then $x \ge$ .... where $x \in \mathbb{Q}$
2	If $-1 \le -x < 3$, then $x \in$ .... in $\mathbb{N}$
3	$4 \times 7 - 3^2 =$ ....
4	$-\sqrt{4^2} =$ ....
5	$\sqrt{(-5)^2} =$ ....
6	$\sqrt{16 + 9} = 4 +$ ....
7	If $a = 0.000625$, then $\sqrt{a} =$ .... in standard form.
8	The additive inverse of $\sqrt{\left(\frac{-2}{5}\right)^2}$ is ....
9	The S.S. in $\mathbb{Z}$ of : $-2x < 5$ is ....
10	If $k - 5 < 0$, then $k <$ ....
11	The solution set of the inequality : $-x > -1$ in $\mathbb{N}$ is ....
12	$4 \times 2^3 - 20 =$ ....
13	$-\sqrt{4} =$ ....
14	$\sqrt{100 - 64} =$ ....
15	$\sqrt{(10)^2 - (8)^2} = 10 -$ ....
16	$\sqrt{36} + \sqrt{16} = \sqrt{\ldots\ldots\ldots}$
17	The additive inverse of the $\sqrt{\frac{4}{25}}$ is ....

18	If the area of a circle 49π cm^2, then the radius length = ... cm.
19	If $a - 3 < 0$, then $a <$ ....
20	The solution set of the inequality : $-x \geq -1$ in $\mathbb{N}$ is ....
21	$4^2 \div 2 \times 3 - 9 =$ ....
22	$196 \div (7 - 5)^2 =$ ....
23	$\sqrt{25 - 9} =$ ....
24	$\sqrt{\sqrt{16}} =$ ....
25	$\sqrt{\frac{25x^2y^2}{36}} =$ .... (in the simplest form).
26	The additive inverse of the number $\sqrt{(-2)^2}$ is ....
27	The side length of a square whose area is $49x^2$ cm^2 is .... cm.
28	If $x > 4$, then $-x$ .... -4
29	$3 \times 4 - 21 \div 7 =$ ....
30	$28 \div 4 + 3 - 2 \times 5 =$ ....
31	$\sqrt{\frac{9}{25}} =$ .... %
32	$\sqrt{(-8)^2 + 6^2} =$ ....
33	$\sqrt{\frac{49a^4b^2}{9}} =$ ....
34	The additive inverse of the number $\sqrt{1\frac{9}{16}}$ is ....
35	The side length of a square whose area is $9x^2$ cm.^{2} is ....

[C] : Essay Problems : -

1	Find in $\mathbb{Q}$ the solution set of the inequality : $3x - 2 < 1$ 2016 Exam (10) Question (4) (a)
2	Find the solution set of the following inequality : $4x + 7 \leq 3$ in $\mathbb{Q}$ 2018 Exam (7) Question (3) (b)
3	Find the S.S. of each of the following : $5x + 4 \geq 3x + 20$ 2018 Exam (9) Question (3) (a)
4	Find the S.S. of each of the following : $x + 9 > 12$ 2017 Exam (14) Question (3) (a)
5	Find the S.S. of each of the following : $3 - 2x \geq 1$, $x \in \mathbb{N}$ 2018 Exam (10) Question (3) (a)
6	Find the solution set of the following inequality in $\mathbb{Q}$: $3x + 1 < 7$ 2017 Exam (10) Question (3) (a)
7	Find the solution set of the following inequality : $4y + 2 \geq 10$, $y \in \mathbb{Q}$ 2017 Exam (6) Question (4) (b)
8	Find the solution set of the following inequality where $x \in \mathbb{Q}$: $5x - 4 \geq 2x + 11$ 2018 Exam (11) Question (5) (a)
9	Find the S.S. of each of the following : $x + 4 > 1$ 2018 Exam (15) Question (3) (a)
10	Find the solution set of the inequality in $\mathbb{Z}$: $3 - 2x \geq 1$ 2018 Exam (12) Question (5) (a)
11	Find in $\mathbb{Q}$ the solution set of the in inequality : $3x - 1 \geq 2$ 2017 Exam (8) Question (4) (b)
12	Find the S.S. of each of the following : $3x + 5 > 20$ 2018 Exam (6) Question (5) (a)
13	Find the S.S. of each of the following : $3x - 1 \leq 2x + 3$ 2018 Exam (1) Question (3) (B)
14	Find the S.S. of each of the following : $x + 3 < 7$ 2018 Exam (8) Question (4) (a)
15	Find the S.S. of each of the following : $2x - 3 \leq 5$ 2018 Exam (3) Question (3) (a)
16	Find in $\mathbb{Q}$ the S.S. of the following : $2x + 15 < 19$ Model 2018 Exam (2) Question (4) (a) (2)

Prep [1]

Algebra - Second Term

Unit [2] - Total



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Prep [1] - Second Term - Algebra - Unit [2] : Probability And Statistics

Lesson [1] : Samples

Definition :

A sample is a small part from a large society that looks like this society and represents it well and is selected randomly.

Types of samples

Samples are classified according to the way used in selecting its items , and in this lesson , we introduce two types of samples :

1 Systematic sample :

Systematic sample is the sample whose elements are selected from the elements of a society distributed randomly by following a certain system or method in selection.

2 Random sample :

Random sample is the sample whose elements are selected from the elements of a society distributed randomly by following a random and irregular method or system of selecting.

- In this sample , each individual must get the same chance of selecting.

So , we can select its elements by two methods :

- Manual method.
- Using the scientific calculator.

Lesson [2] : Probability

Definition of random experiment:

Random experiment is an experiment in which we can specify all its possible outcomes before carrying it out but we cannot determine certainly which of them will occur.

Sample space :

Sample space is the set of all possible outcomes of a random experiment and it is denoted by S

For example:

- When we toss a piece of coin once , then the sample space is $S = \{H , T\}$
- When we roll a fair die once observing the apparent number on the upper face , then the sample space is $S = \{1 , 2 , 3 , 4 , 5 , 6\}$

For example:

If A is the event of appearance of an odd number when rolling a fair die once and observing the apparent number on the upper face , then $A = \{1 , 3 , 5\}$, $A \subset S$

Generally

The probability of any event occurrence $A \subset S$ is denoted by P (A) and it is given by using the relation :

$$P(A) = \frac{\text{The number of elements of the event « A »}}{\text{The number of elements of sample space « S »}} = \frac{n(A)}{n(S)}$$

Remarks

1 **The impossible event :** is the event that has no chance for occurring.

i.e. the probability of the impossible event = Zero

2 **The certain event :** is the event that has all the possible outcomes.

i.e. the probability of the certain event = 1

3 The value of probability of any event is not less than zero and not more than one

i.e. $0 \leq$ The probability of an event occurrence ≤ 1

Example 2 **If a fair die is rolled once and we observe the apparent number on the upper face , find the probability of each of the following events :**

1. A is the event of appearance of a number more than 4 (Approximating the result to the nearest hundredth)
2. B is the event of appearance of an even number.
3. C is the event of appearance of a number equal to 5 (Approximating the result to the nearest tenth)
4. D is the event of appearance of a number equal to 7

Solution

$S = \{1 , 2 , 3 , 4 , 5 , 6\}$, $n(S) = 6$

1. $A = \{5 , 6\}$, $n(A) = 2$

   $\therefore P(A) = \frac{2}{6} = \frac{1}{3} \simeq 0.33$ (to the nearest hundredth)

2. $B = \{2 , 4 , 6\}$, $n(B) = 3$ $\therefore P(B) = \frac{3}{6} = 0.5$

3. $C = \{5\}$, $n(C) = 1$

   $\therefore P(C) = \frac{1}{6} \simeq 0.2$ (to the nearest tenth)

4. $D = \{\ \}$ or $\varnothing$, $n(D) =$ Zero

   $\therefore P(D) = \frac{0}{6} =$ Zero (the impossible event)

Exercises

[A] : Choose The Correct Answer : -

No.	Question
1	Which of the following could be the probability of an event ? (a) 0.25 (b) – 0.25 (c) 1.25 (d) 2
2	Which of the following may be probability of an event ? (a) – 0.3 (b) 102 % (c) 2 (d) 65 %
3	Which of the following is the probability of occurrence of event ? (a) 1.2 (b) – 0.5 (c) 215% (d) 75%
4	Which of the following could be a probability of an event ? (a) – 0.25 (b) 78 % (c) 1.5 (d) 120 %
5	Which of the following may be probability of an event ? (a) – 0.25 (b) 87 % (c) 1.05 (d) 130 %
6	Which of the following may be probability of an event ? (a) – 3.8 (b) 0.98 (c) – 1 (d) 1.4
7	Which of the following may be probability of an event ? (a) – 0.35 (b) 98% (c) 102% (d) 1.13
8	The probability of the impossible event = ... (a) 0 (b) 1 (c) 2 (d) 3
9	The probability of certain event = ... (a) 0 (b) 1 (c) 2 (d) $\varnothing$
10	The sum of probabilities of all events of any random experiment is .... (a) 0.5 (b) 0.3 (c) 0.2 (d) 1
11	If the probability of occurring an event is $\frac{1}{8}$, then the not occurring equal .... (a) $\frac{7}{8}$ (b) $\frac{5}{8}$ (c) 1 (d) zero
12	If the probability of success of a student is 75% , then probability of his failure = ... (a) 10% (b) 25% (c) 30% (d) 50%
13	If the probability of success of a student is $\frac{7}{10}$, then the probability of failure is .... (a) $\frac{3}{10}$ (b) $\frac{1}{10}$ (c) 1 (d) 0.7

14 A coin is tossed once , then probability of getting (Tail) = ...

(a) $\frac{1}{2}$ (b) $\frac{1}{6}$ (c) 1 (d) 0

15 As flipping a fair coin once , the probability of appearing a head is ....

(a) 5 (b) 5% (c) 50 % (d) zero

16 A coin is tossed 160 times , then the approximate expected number of the appearance of a head is ....

(a) 60 (b) 78 (c) 90 (d) 159

17 If a fair die is tossed once , then the probability of getting an odd number is ....

(a) zero (b) 1 (c) 2 (d) $\frac{1}{2}$

18 A fair die is rolled once , the probability of rolling an even number is ....

(a) $\frac{1}{3}$ (b) $\frac{1}{6}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$

19 A die is thrown once and observed the upper face the probability of appearance number is divisible by 3 = ...

(a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

20 The probability of getting 5 when a cubic die is rolled once is ....

(a) $\frac{1}{5}$ (b) $\frac{5}{6}$ (c) 5 (d) $\frac{1}{6}$

21 If fair die is tossed once , the probability of getting a number satisfying the inequality $6 < x < 9$ is ....

(a) zero (b) 2 (c) $\frac{1}{2}$ (d) 1

22 There are 480 pupils in a school , 120 of them failed. A pupil is chosen at random , then the probability that the pupil is succeeded = ...

(a) 0.25 % (b) 0.75 (c) 0.8 (d) 0.667

23 A class contain 50 students , 40 of them are succeed in test , then the probability of failed is equal ....

(a) $\frac{4}{5}$ (b) $\frac{1}{5}$ (c) $\frac{5}{4}$ (d) $\frac{1}{10}$

24 A class has 25 boys and 20 girls. A pupil is selected randomly , then the probability that the pupil is a girl = ...

(a) $\frac{20}{25}$ (b) $\frac{25}{45}$ (c) $\frac{4}{9}$ (d) $\frac{5}{4}$

25 There are 21 boys and 15 girls in a classroom , one pupil is chosen randomly , the probability that the chosen pupil is a girl = ...

(a) $\frac{5}{12}$ (b) $\frac{7}{12}$ (c) $\frac{4}{7}$ (d) $\frac{5}{6}$

[B] : Complete the Following : -

1	The probability of the certain event = ……………
2	If the probability that the pupil succeeds is 0.85 , then the probability of his failure is ……………
3	If the probability of succeeded student is $\frac{4}{5}$, then the probability of failed is ……………%
4	If the probability that a student be absent in a school is 0.15 , and the number of students in this school is 600 , then the number of the present students that day is ……………
5	The probability of occurring an event is $\frac{5}{8}$, then the probability of not occurring of the same event = ……………
6	A class has 25 boys and 20 girls. A pupil of them is selected randomly , then the probability that the pupil is a girl = ……………
7	If the probability of success of a student is 0.7 , then the probability of his failure ……………
8	A class has 36 students , the number of boys is 20 , if a student is chosen randomly , then the probability that the student is a girl = ……………
9	…………… $\leq$ p (any event) $\leq$ ……………
10	When a fair die is tossed once , then the probability of getting an even number = ……………
11	The sum of probabilities for all possible outcomes of random experiment is ……………
12	If a die is thrown once then the probability of appearance number 3 on the upper face = ……………
13	The probability ($\varnothing$) = ……………
14	In the experiment of throwing a fair die once and observing the upper face , the probability that the apparent even prime number = ……………
15	The probability of the impossible event = ……………

[C] : Essay Problems : -

1	**A coin is tossed twice, calculate the probability of :** (1) Appearance of at least one head. (2) Appearance of at most one head. 2016 Exam (7) Question (5) (b)
2	A card is chosen randomly from ten cards numbered from 1 to 10 **What is the probability that the chosen card shows :** (1) An odd number. (2) A prime number. (3) An even number greater than 4 2017 Exam (6) Question (5) (b)
3	A box contains 6 cards numbered from 1 to 6 If one card is drawn randomly , **write the sample space , then find the probability of :** (1) Getting an odd number. (2) Getting a number divisible by 7 2016 Exam (5) Question (5) (b)
4	A box contains 5 white balls , 4 black balls and 7 red balls. A ball is drawn randomly from the box. **Calculate the probability of the following events :** (1) The ball is white. (2) The ball is red. (3) The ball is not white. 2018 Exam (1) Question (5) (a)
5	In the experiment of a fair die once. Find the probability of appearance of even number. 2017 Exam (7) Question (3) (b)
6	A card selected randomly from ten cards numbered from 1 to 10 What is the probability that selected card shows ? (1) An odd number. (2) A prime even number. 2018 Exam (11) Question (3) (b)
7	A fair die is rolled once and the number of dots on the upper face is observed. Write down the sample space , **then find the probability of each of the following events :** (1) Getting a number satisfying the inequality : $1 \leq X \leq 6$ (2) Getting a number greater than 6 (3) Getting a number satisfying the inequality : $2 < X < 4$ 2017 Exam (15) Question (5) (b)

8

A fair die is rolled once. **Calculate the probability of rolling :**

(1) An even number. (2) A number greater than 2

2018 Exam (7) Question (5) (b)

9

If a fair dice is thrown once , write the probability of :

(1) Getting an even number. (2) Getting the number 5 on the upper face.

2017 Exam (4) Question (5) (a)

10

A factory of a tire record the distance that traveled by a certain type of them before damage for 800 units of this type as following.

The distance in thousand (km.)	Less than 50	50 to 100	More than 100 till 150	More than 150
The number of damage tire	80	120	280	320

If you bought a tyre of this type , what is the probability of change it :

(1) Before traveled 50 thousand km.

(2) After traveled more than 100 thousand km.

Model 2018 Exam (1) Question (5)

11

A box contains of 6 red balls , 4 blue balls , 3 white balls. A ball is drawn randomly from the box.

Calculate the probability of :

(1) The drawn ball is white

(2) The drawn ball is not blue.

2018 Exam (5) Question (5) (b)

12

The probability of the absence of a student in one day = 0.15 , and the number of students in this school = 600 students. Find the number of present students in the school in this day.

2018 Exam (8) Question (4) (b)

13

A box contains number of similar balls , 2 are green , 4 are blue and the rest is red if the probability of selecting a green ball = $\frac{1}{6}$ find the number of red balls.

2017 Exam (11) Question (5) (b)

14

There are 480 pupils in a school , 120 of them failed. A pupil is chosen at random, find the probability that the pupil is succeeded.

2017 Exam (7) Question (5) (b)

Homework

[A] : Choose The Correct Answer : -

1	Which of the following could be a probability of an event ? (a) – 0.25 (b) 78 % (c) 1.5 (d) 120 %
2	A coin is tossed once , then probability of getting (Tail) = ... (a) $\frac{1}{2}$ (b) $\frac{1}{6}$ (c) 1 (d) 0
3	A class contain 50 students , 40 of them are succeed in test , then the probability of failed is equal .... (a) $\frac{4}{5}$ (b) $\frac{1}{5}$ (c) $\frac{5}{4}$ (d) $\frac{1}{10}$
4	The probability of the impossible event = ... (a) 0 (b) 1 (c) 2 (d) 3
5	If a fair die is tossed once , then the probability of getting an odd number is .... (a) zero (b) 1 (c) 2 (d) $\frac{1}{2}$
6	Which of the following may be probability of an event ? (a) – 0.3 (b) 102 % (c) 2 (d) 65 %
7	If the probability of occurring an event is $\frac{1}{8}$, then the not occurring equal .... (a) $\frac{7}{8}$ (b) $\frac{5}{8}$ (c) 1 (d) zero
8	If fair die is tossed once , the probability of getting a number satisfying the inequality $6 < x < 9$ is .... (a) zero (b) 2 (c) $\frac{1}{2}$ (d) 1
9	Which of the following may be probability of an event ? (a) – 0.25 (b) 87 % (c) 1.05 (d) 130 %
10	As flipping a fair coin once , the probability of appearing a head is .... (a) 5 (b) 5% (c) 50 % (d) zero
11	A class has 25 boys and 20 girls. A pupil is selected randomly , then the probability that the pupil is a girl = ... (a) $\frac{20}{25}$ (b) $\frac{25}{45}$ (c) $\frac{4}{9}$ (d) $\frac{5}{4}$
12	Which of the following could be the probability of an event ? (a) 0.25 (b) – 0.25 (c) 1.25 (d) 2
13	The probability of certain event = ... (a) 0 (b) 1 (c) 2 (d) ∅

No.	Question
14	There are 21 boys and 15 girls in a classroom , one pupil is chosen randomly , the probability that the chosen pupil is a girl = …………… (a) $\frac{5}{12}$ (b) $\frac{7}{12}$ (c) $\frac{4}{7}$ (d) $\frac{5}{6}$
15	A fair die is rolled once , the probability of rolling an even number is …………… (a) $\frac{1}{3}$ (b) $\frac{1}{6}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$
16	Which of the following is the probability of occurrence of event ? (a) 1.2 (b) – 0.5 (c) 215% (d) 75%
17	A die is thrown once and observed the upper face the probability of appearance number is divisible by 3 = …………… (a) $\frac{1}{4}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$
18	If the probability of success of a student is 75% , then probability of his failure = …………… (a) 10% (b) 25% (c) 30% (d) 50%
19	There are 480 pupils in a school , 120 of them failed. A pupil is chosen at random , then the probability that the pupil is succeeded = …………… (a) 0.25 % (b) 0.75 (c) 0.8 (d) 0.667
20	If the probability of success of a student is $\frac{7}{10}$, then the probability of failure is …………… (a) $\frac{3}{10}$ (b) $\frac{1}{10}$ (c) 1 (d) 0.7
21	Which of the following may be probability of an event ? (a) – 3.8 (b) 0.98 (c) – 1 (d) 1.4
22	A coin is tossed 160 times , then the approximate expected number of the appearance of a head is …………… (a) 60 (b) 78 (c) 90 (d) 159
23	Which of the following may be probability of an event ? (a) – 0.35 (b) 98% (c) 102% (d) 1.13
24	The sum of probabilities of all events of any random experiment is …………… (a) 0.5 (b) 0.3 (c) 0.2 (d) 1
25	The probability of getting 5 when a cubic die is rolled once is …………… (a) $\frac{1}{5}$ (b) $\frac{5}{6}$ (c) 5 (d) $\frac{1}{6}$

[B] : Complete the Following : -

1	The probability of the certain event = ...
2	When a fair die is tossed once , then the probability of getting an even number = ...
3	If the probability that the pupil succeeds is 0.85 , then the probability of his failure is ....
4	If the probability that a student be absent in a school is 0.15 , and the number of students in this school is 600 , then the number of the present students that day is ....
5	The probability (∅) = ...
6	A coin tossed 160 times , then an approximate expected number of the appearance of a head is ....
7	A class has 36 students , the number of boys is 20 , if a student is chosen randomly , then the probability that the student is a girl = ...
8	If the probability of success of a student is 0.7 , then the probability of his failure ....
9	When tossing a coin once , then the probability of the appearance of a tail = ...
10	In the experiment of throwing a fair die once and observing the upper face , the probability that the apparent even prime number = ...
11	The sum of probabilities for all possible outcomes of random experiment is ....
12	The probability of occurring an event is $\frac{5}{8}$, then the probability of not occurring of the same event = ...
13	A class has 25 boys and 20 girls. A pupil of them is selected randomly , then the probability that the pupil is a girl = ...
14	The probability of the sure event = ...
15	When a coin is tossed once , then the probability of appearance of head is ....

[C] : Essay Problems : -

1	A box contains 15 cards numbered from 1 to 15 , A card is drawn randomly find the probability of : (1) The drawn card carries a prime number (2) The drawn card carries a number divisible by 3 (3) The drawn card carries a perfect square number 2018 Exam (10) Question (5) (a)
2	A coin is tossed twice , **find the probability of :** (1) Getting 2 heads. (2) Getting one tail only. 2018 Exam (8) Question (3) (b)
3	A box contains 80 similar ball. Some of them are red and the rest is blue. If the probability of drawing a red ball is $\frac{1}{4}$, **find the number of blue balls.** 2017 Exam (5) Question (5) (a)
4	A card chosen at random from ten cards numbered from 1 to 10 **What is the probability that the selected card shows :** (1) An odd number greater than 3 (2) A prime number. (3) A number divisible by 5 2017 Exam (8) Question (5) (b)
5	A bag contains 5 red balls , 6 green balls and 4 blue balls , a ball is chosen randomly from the bag , **find the probability that the ball is :** (1) Red. (2) Green or blue. (3) Not blue. (4) Yellow. 2016 Exam (10) Question (5) (a)
6	A box has 5 red balls , 3 yellow balls and 7 white balls. The balls are identical. A ball is drawn from the box randomly. **What is the probability that the drawn ball is :** (1) Red ? (2) White ? (3) Not red ? 2016 Exam (14) Question (5) (b)
7	**The population of a city has been growing according to the rule :** $y = 3\,(1.02)^n$ million. Where y is the population and n is the number of years. Calculate the population that will be in 2 years in the standard form. Model 2018 Exam (1) Question (4) (b)

8	A card selected randomly from ten cards numbered from 1 to 10 **What is the probability that selected card shows :** (1) An odd number (2) A prime even number. (3) Non-prime number. 2018 Exam (6) Question (3) (b)
9	A bag contains 3 red balls , 4 green balls and 2 black balls. **Find the probability when the selected ball is :** (1) red. (2) green. (3) white. 2018 Exam (2) Question (5) (b)
10	A die is rolled once and the number of dots on the upper face is observed. (1) Write the sample space. (2) Find the probability of getting a number satisfies the inequality : $1 \le x \le 6$ (3) Find the probability of getting a number > 6 2017 Exam (13) Question (3) (b)
11	A fair die is rolled once and observe the number on the upper face **Find the probability of getting :** (1) a prime number (2) a number less than 7 2018 Exam (2) Question (3) (b)
12	If a regular die is thrown once and observed the number on upper face , **find the probability of each of the following :** (1) Getting a prime even number. (2) Getting an odd number less than 4 Model 2018 Exam (2) Question (5) (a)
13	A card is chosen at random from ten cards numbered from 1 to 10 **What is probability that the selected card shows :** (1) An even number. (2) A getting number divisible by 3 2018 Exam (13) Question (4) (b)
14	A box contains 4 white balls , 5 red balls and 2 blue balls , A ball is drawn randomly from the box , **calculate the probability of the following events :** (1) The drawn ball is red. (2) The drawn ball is white or blue. (3) The drawn ball is green. 2016 Exam (13) Question (5) (b)

15	A school has 480 students , and the number of girls is 300 If a student is chosen randomly , **then find the probability that the student is :** (1) A girl. (2) A boy. 2017 Exam (8) Question (3) (a)
16	A card is chosen randomly from ten cards numbered from 5 to 14 **what is the probability that the chosen card is :** (1) An even number (2) A prime number 2018 Exam (3) Question (5) (b)
17	A card is drawn randomly from 15 cards numbered from 1 to 15 **Find the probability that the drawn card carries :** (1) A prime number greater than 7 (2) A number divisible by 2 2016 Exam (4) Question (5) (b)
18	A box contains 5 black balls , 3 white balls and 6 red balls , if a ball is drawn randomly from the box **calculate the probability of the drawn ball is :** (1) White. (2) Red. (3) Not red. 2017 Exam (9) Question (5) (b)
19	The set $\{2 , 3 , 5\}$ is used in writing a 2 – digit number. **Find the probability of each of the following events :** (1) The sum of the two digits is 8 (2) Both of the two digits are equal 2018 Exam (14) Question (5) (b)